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JOHN CHURCHILL, NEW BURLINGTON STREET;

AND

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MDCCCLIV.

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Session 1854—55.

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[illegible]petual Pupils are eligible to be Assistant House-Surgeon for Six Months, and [illegible] Surgeon for Twelve Months (without additional fee), when properly qualified for t[illegible]e.

[illegible]r Course of Instruction will commence on Monday, October 2nd, when [illegible]holarships and Prizes for the past year will be awarded.

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OCTOBER, 1854.

Analytical and Critical Reviews.

Bibliographical Record.

Original Communications.

Chronicle of Medical Science.

THE BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW.

OCTOBER, 1854.

PART FIRST.

Analytical and Critical Reviews.

Review I.

1. *Change of Climate considered as a Remedy in Dyspeptic, Pulmonary and other Chronic Affections; with an Account of the most eligible Places of Residence for Invalids in Spain, Portugal, and Algeria, at different Seasons of the Year: and an Appendix on the Mineral Springs of the Pyrenees, Vichy, and Aix les Bains.* By D. J. T. Francis, M.D., Physician to the Margaret Street Dispensary for Consumption, &c.—*London*, 1853. Post 8vo, pp. 339.
2. *The Climate of Port Philip.* By J. B. Clutterbuck, M.D., Nine Years' resident in the Colony.—*London*, 1850. 12mo, pp. 156.
3. *The Climate of Australia.* By Wm. H. Archer and Wm. Howitt.—(Extracts from 'The Times' and 'Athenæum.') 1853.

The influence of Climate upon the health of man, has ever been a subject of deep interest to the medical philosopher. It is peculiarly so at the present time, when the facilities of locomotion have set all the world on the move, and countries and peoples that were formerly but little known are now, by the aid of steam, brought nearer to this metropolis than Dublin or Edinburgh were fifty years ago. The modern invalid is no longer content with a visit to any of the time-honoured shrines of Hygeia in his own country; for they possess the fatal advantage of being too near home; nor to those foreign depôts for the migrating sick of all nations, whose traditionary fame had hitherto secured to them a monopoly, as for example, Rome, Pisa, Madeira, and Provence. More distant climes are now sought for—even to the other side of the earth—hence the sunny south is eclipsed by the shores of the Pacific, the "island of the blessed" in the Eastern Atlantic, by other islands with brighter skies and ranker vegetation in the Polynesian seas; and even "sweet Provence," with its limpid streams and verdant valleys, sinks into insignificance when com-

pared with the auriferous regions of Tasmania, alleged to possess the *ne plus ultra* of climates on the terrestrial globe.

There is a fashion in climates, as in many other matters relating to medicine, fostered by the caprice and love of change of noble and wealthy invalids, which may in some sort account for the extraordinary opinions which have prevailed from time to time as to the sanative virtues of localities positively insalubrious. The habit of estimating the qualities of a climate from the luxuriance of the vegetation, and the gratification of the animal feelings of persons in sound health, is perhaps the chief source of the popular belief in the efficacy of foreign climates in the treatment of mortal diseases; but, as we have elsewhere observed, "however agreeable to the senses warm air, sunny skies, and luxuriant vegetation may seem, they afford no proof of salubrity, nor of the beneficial effect of any climate." The author of one of the works which we are about to review, is strongly imbued with this popular view of a salubrious climate, and, carried away by the glorious scenery and almost tropical vegetation along the south of Spain, he awards to certain localities in Andalusia the palm of salubrity, in reference to pulmonary complaints, which has been denied to Italy and Madeira. Yet patients die of phthisis in Malaga, the El Dorado of climates, according to Dr. Francis, as well as in either of the last-named medical stations. Nor is this to be wondered at, when we bear in mind that the valuable 'Statistical Reports on the Sickness, Mortality, and Invaliding in the Army' have shown that there is no immunity from what has been so erroneously called the "English disease" in any quarter of the globe, but that pulmonary consumption is a prevalent and fatal disease in all climes and nations.

There is no perfect climate—all we hear about "earthly paradises," and "heavens upon earth" notwithstanding;—for a climate to be perfect in relation to phthisis, should not vary in temperature from day to day throughout the year: and the transition from day to night, as well as from one season to another, should be imperceptible. As a condition of this kind is incompatible with the physical laws to which this planet is amenable, it only remains for the climatologist to ascertain where that climate is to be found which approaches nearest to *equality* of temperature, (Dr. Francis says Malaga is the place), for in that quality consists the chief virtue of climate as regards pulmonary complaints. The degree of heat is a very inferior consideration as compared with the range of temperature, and there is no reason why the mild, humid, relaxing, atmosphere of Rome should be more efficacious in the treatment of phthisis than the cold rarefied air of Siberia, if the temperature of the latter were equable.

Before examining the claims upon our attention put forth in favour of the Spanish climate, let us glance at the history of the more distant and still more lauded climate of Australia Felix. This favoured country, we have been taught to believe, is the modern Arcadia. Its name has been associated with smiling landscapes, all gently undulating, covered with fruits, flowers, and odoriferous herbs. Banks, on which wild thyme and violets continually grow, and an eternal summer to crown the whole. The belief was general that for invalids, especially for consumptive invalids, this country afforded the perfection of climates. This

notion was undisputed until the gold discovery in 1851, when the peculiarities of the country became better and more extensively known, and, as a matter of course, the real character of the climate more accurately described by competent observers. There are two descriptions of this climate diametrically opposed to each other. So much has been said of the beauty, mildness, and salubrity of the climate of Australia, it would have been a very fruitless task to offer any observations of an unfavourable tendency, until a sufficient number of successful and unprejudiced voyagers returned, to bear testimony by their own personal experience. We have now before us several documents from different sources, descriptive of the leading characters of this famous climate; a few extracts from which we shall place before our readers. The following passages are taken from the diary of Mr. W. H. Archer, assistant to Mr. Neisen, the actuary at Melbourne. The meteorological observations were made in a tent in Canvas Town, on the banks of the Yarra Yarra, near Melbourne.

"Rounded the Cape in the middle of October; wet, squally, and wretchedly cold. Consoled by thinking of the land of promise, the gentlest and healthiest of climates. Landed at Port Philip the first week in November, the commencement of the Australian summer. First few days very fine, somewhat over warm though, 80° in the shade. Still very fine, a moderate breeze from the south, fresh from the sea. All true about the climate. Fixed my tent near the Yarra, and hung up my thermometer. November 5 (my first day), the mercury rose to 90° in the shade. Lay panting on a box the greater part of the day. Next day so chilly was obliged to put thicker trousers on, and an extra coat. Dark heavy clouds overhead all day; no sun visible. Mercury once got up to 64°, and gradually sunk down again. In the evening I fairly shook with cold. November 7, morning, early; not a cloud to be seen, air fresh and temperature delicious. At breakfast the thermometer stood at 70°, but the breeze soon dropped, and at about one o'clock the quicksilver stood at 96° in the shade. Lay gasping with nothing but duck and canvas about me. Did nothing but drink water, lemonade, ginger beer, and cold tea. November 8, heat abated, not above 84°; the day following it fell to 72°, and in the evening to 58°. Then came a succession of hot days; Monday, 94° in the shade; Tuesday, 96° in the shade; Wednesday 94°; then a few moderate days; then three successive days at 84°, 74°, 70°, in the shade; and then cold, being 60° and 58°; moderate again for a few days; then cold; then hot again, 96°, 96°, 96°, in the shade; then 76°, 76°; then 84°; then 64°, and very wet; then 100° in the shade, with hot wind, sending clouds of infinitesimally small sand, that found its way through everything: in the evening the wind shifted, and all night long the rain poured in torrents: awoke in a temperature of 62°, which diminished the next day to 55°. December 30, another hot wind, day and night. December 31, worse; thermometer rose to 110° in the shade, and 130° in the sun; sky dark, with sand clouds rushing over our heads; tents blown down by hot blast; some people died from the heat and suffocation; mouth full of dust. January 8, mercury at 64°, cold and rain. January 9, mercury at 60°, colder, and much more rainy. January 10, mercury at 54° all day, with rain; great-coats and gloves; several blankets at night; tents blown down by cold blast."

Surprised at the strangeness of the summer, and supposing that all which had been said in England about the beauty of the climate of Australia probably had reference to Sydney or to Adelaide (South Australia), this writer, upon inquiry from old residents, was assured that the variations of the temperature in winter were quite as severe. On the 26th of November there was a hailstorm in Sydney, which demolished all the

windows of houses and churches that lay in its course. The hailstones were commonly "the size of greengages." In Sydney, the thermometer was continually at 130° in the sun; and in Adelaide, it was sometimes 140°. As for the hot dust blast, called a "brickfielder," they had it just as bad at both places. It would thus appear that one "heaven upon earth" is about as objectionable as another. The complaints of the country are influenza, diarrhœa, dysentery, boils, "eye-blight," consumption, and a strange sort of cough, which the people call "the guitar." All these are very prevalent, scarcely any one escaping one or more of them. Many parts of Australia would be fatal, I should think, to persons with pulmonary complaints. Yet consumptive patients are sent out here. Some allowance, however, must be made for the unusual severity of the summer of 1852–53; but the hot wind, or simoom, and clouds of dust or sand, are common in the finest seasons.

William Howitt, writing from the "Ovens," December, 1852, complains bitterly of the climate. He says:

"The dust winds, and violent variations of the atmosphere, often of no less than 100 degrees in a day, would try any constitution. The season has been frightfully unhealthy and fatal to many. Hundreds are still lying ill from the insidious influence of this 'fine salubrious climate.' At Melbourne, scarcely a soul but what has been ill. Gentlemen who have been in India, China, and over Europe and America, say that this is the worst climate they know. Without any apparent cause, people are everywhere attacked with dysentery, rheumatism, cramp, and influenza, and the little black fly of Australia is a perfect devil."

Another writer, Mr. C. Thompson, states of the climate of Melbourne,

"That it is a gross deception to say that it is so salubrious. The glowing descriptions of this climate should never have been promulgated. For instance, yesterday, January 1, 1853, in the morning the thermometer stood at 102° indoors, and 128° in the sun, with a violent gale of blinding, burning dust, as bad as on a Nubian desert, and ere sunset the temperature fell 40 degrees. This is a frequent occurrence during the summer months. Dysentery has been a prevailing complaint amongst all classes of all ages; and in many instances rapidly fatal. Invalids should not be deceived regarding the climate, which is more adapted to vigorous constitutions than to those labouring under infirmity."

Dr. Clutterbuck, who was nine years resident in the colony, observes:

"No climate, probably, is more variable than that of Port Philip. I have seen the thermometer range, in the course of twenty-four hours, between 70° and 102°; in the shade sometimes standing at 65°, 70°, 80°, or 86°; in the sun, at 132°. New South Wales and Van Diemen's Land are better provided with rain than England. Thus London, generally noted for its wet climate, has an annual quantity of rain equal to 22·19 inches; while the average which falls upon a station in New South Wales is 48 inches, in the sister colony 41 inches, yearly. Fever, dysentery, inflammation of the liver, apoplexy, palsy, croup, in fine, inflammatory and other diseases, are of as frequent occurrence as in England. The two first have all the characters of tropical maladies, and assume a violence of form and rapidity of progress unknown in the mother country; and I am surprised to find a medical writer of the present day,* in adverting to the Australian climate, thus expressing himself:—'Fevers are almost unknown, and the same may be said of hooping-cough, croup, &c.' Consumption, the greatest scourge to persons residing in England, consigns many victims in Port Philip to a premature grave. To imagine,

* Sir James Clark on Climate.

as many do, that emigration to this colony tends either to prevent the development of this complaint, or to arrest its progress, is a fatal delusion. Even during the earlier stage of consumption in England, I have never witnessed so urgent and oppressed a state of respiration as that which occurs in this portion of New South Wales. This fact, apparently, is to be ascribed to the stimulating effect of the intense summer heat; as also to the extreme variations in the temperature of the atmosphere within twenty-four hours. In whatever manner we may attempt to explain the fact, I have little hesitation in expressing my belief that the most intense cold of England (added, if you please, to a London fog) does not produce so baneful an influence, on a habit predisposed to consumption, as the sudden vicissitudes of the Australian climate." (pp. 19, 20.)

It should be observed, that the preceding observations refer chiefly to the climates of the principal towns of the colony. If the invalid is prepared to forego all residence in towns or villages, and dwell in the vast solitudes of the bush, several hundred miles in the interior, he will there find a climate less obnoxious to these serious changes. This is what has so deceived strangers, who very naturally expected to find the "finest climate in the world" at Melbourne, Sydney, and Adelaide.

The most agreeable period of the day is the early morning, between six and eight o'clock. The air is then clear, light, dry, fresh; and a cool brightness pervades the whole atmosphere and surrounding scenery. After this, the day may be anything. The sunsets are often magnificent. Though the twilight is of very brief duration, the heavens present a grave scenery, of fading purple in grand and well-defined designs, which, in the clear solitudes of the bush, suggest the profoundest melancholy, by their associations with intense beauty and the loneliness of death. But the air is generally cold, and what we understand in England by a "sweet summer evening" is comparatively unknown in Australia Felix.

The chief purpose of Dr. Francis's book is to show the superior claims, in a sanitary point of view, of the climate of Spain over that of Italy, for pulmonary complaints. He observes:

"An experience of two winters passed in Italy, convinces me that much of the objection so forcibly urged by Dr. Burgess against the climate of that country is well founded. An experience of three other winters passed in the Peninsula is equally convincing, that when judiciously selected cases are sent to Spain, each one to the locality best adapted for its treatment, the climate of that country, in its good results, will rarely disappoint any reasonable expectation."

In the first place, let us examine the nature of these objections against the climate of Italy. We maintain that much misconception prevails with respect to the efficacy of *foreign* climates in cases of pulmonary consumption. Our views are contained in the following summary:

Madeira, with all its sanitary fame, is no exception to this rule, as the meteorological observations of Drs. Heineken, Gourlay, and Mason incontestably establish. Malta is subject to great vicissitudes of temperature, and to the baneful effects of the Sirocco and Libeccio—African blasts. The climate of the south of France is rendered most injurious to consumptive invalids by the influence of the Mistral, the scourge of Provence: the mortality amongst the natives shows this. Nice, which exhibits the luxuriant vegetation of the tropics, is subject to great alternations from

heat to cold, and the deaths by phthisis are numerous even amongst the inhabitants. The climate of Italy, however delightful to persons in good health, affords no immunity from pulmonary disease. It has been vastly overrated, especially as an adjuvant in the cure of phthisis; and the localities generally recommended are not the most favourable. For example: Northern Italy, which has been hitherto overlooked by the profession, affords, in the reviewer's opinion, two of the best localities for the residence of pulmonary invalids throughout the Italian peninsula—namely, Como and Venice. Invalids residing in Italy will find the summer climate of Lake Como the best adapted for pulmonary complaints. The transitions of temperature are more gentle here than at any other station in Italy, and its climate approaches nearer to equability than elsewhere. Venice presents peculiar advantages.

The climate of this singular city is, in great measure, exempt from those violent atmospheric perturbations which are the bane of the Neapolitan seaboard; whilst it possesses a certain mildness of character and equability, often unknown in some of the more southern parts of Italy. Besides, there is the exercise of the gondola, the gliding motion and gentle oscillation of which are so peculiarly adapted for consumptive invalids. Genoa is admitted by all writers to be one of the most unfavourable localities in Italy for pulmonary complaints. Florence is equally prejudicial. The climate of Pisa is far too relaxing, humid, and murky, to be beneficial in tuberculous disease. The Roman climate, if mild, is sedative and depressing; and owing its mildness to malarious emanations, cannot prove sanative, particularly in a malady characterized by depression of the vital force, and accompanied by vitiated nutrition. It is a mistake to suppose that a warm, humid, relaxing atmosphere can benefit pulmonary disease. Cool, dry, and still air, appears a more rational indication, especially for invalids born in temperate regions. The climate of Naples is the most dangerous throughout Italy for persons suffering from affections of the respiratory organs.

Dr. Francis considers the climate of the peninsula to be exempt from most of the disadvantages of that of Italy. He observes:

"Comparing Spain with Italy, in point of advantages of climate, I think that reason, as well as such little experience as there is on the subject, would incline us to look very favourably on the claims of the former. First, its latitude, which, in regard to the places of common resort, extends many degrees further south. The latitudes of Rome and Naples, for instance, are $41\frac{1}{2}°$ and $40\frac{1}{2}°$, whilst that of Malaga is $36\frac{1}{2}°$. Then the physical disposition of the two countries. The whole of the Mediterranean coast of Spain may be said to have a southerly aspect; whilst, as a general rule, walls of lofty mountains, running parallel to the sea, form a huge protective barrier on the north. Between these and the sea lie those strips of smiling country which occur at frequent intervals all along the coast, sheltered and basking in the sun, and producing a vegetation which, for force of development, seems to be singular in southern Europe." (pp. 2, 3.)

There are two perfectly distinct forms of climate in the Spanish peninsula. One pertains to the littoral portions of that country, the other to the interior. The air of central Spain is dry and rare, and often agitated by winds. The range of the thermometer is very great, and its variations sudden and extreme. However beneficial such a climate may be to

the nervous or dyspeptic, the pulmonary invalid incurs great risk by remaining at all in the country. The Mediterranean, or southern and eastern coast, enjoys the warmest winters in Europe, and it is to a description of this part of the country that a large portion of Dr. Francis's book is devoted.

"The air is decidedly dry, especially in the centre, about Alicante and Valencia, where the land, unless artificially watered, is in many parts barren. More of humidity occurs as we approach the Straits of Gibraltar on the one hand and the French frontier on the other. All along this coast the east winds, no longer dry, harsh, and irritating, but somewhat moist and soothing, unless at Gibraltar, are of frequent occurrence at all seasons. They help to temper the extreme natural dryness of the air and keep down the summer temperature. The skies are unclouded; the vegetation and general aspect of nature oriental. It is a land of flowers and fruits; of sugar, cotton, dates, cochineal, and indigo; of rice, wine, and oil. And everything that grows, wherever there is water, attains a prodigious luxuriance. The summers on this coast would be found too hot, unless for persons in good health; but for the rest of the year the climate is delicious." (p. 97.)

It will be seen, from the foregoing extract, that Dr. Francis attributes considerable importance to the latitude of those parts of Spain which he recommends for consumptive invalids, and points to the luxuriant vegetation as an indication in favour of the climate. He frequently refers to these two features throughout his work. Now, the fact of Malaga being four or five degrees farther south than Rome or Naples does not at all imply that the climate of the former is more salubrious than the climates of the last-named cities, whatever it may indicate as to increase of temperature. And luxuriant vegetation is by no means an index of the healthiness of any locality. The author, however, advances other arguments of a more legitimate character in support of his views, as, for instance, the extraordinary equability of temperature which he describes as existing in Malaga, and other adjacent cities, which we shall enter fully into by and by; but we may remark *in limine*, that this equability of temperature, the grand desideratum of all climates, is not necessarily the result of either the latitude or the vegetation of the place.

CLIMATE OF MADRID.

Dr. Francis commences with the climate of Madrid, which he pronounces to be, what is pretty generally known, unhealthy and dangerous for invalids. Madrid is very nearly in the centre of the Peninsula, in latitude 40° 24′, population 250,000. It is surrounded by a naked, treeless country, like a desert, or a solitude as unbroken as any in the wilds of Estremadura. The chief peculiarities of the climate are the extent of daily and yearly range of the thermometer, and the remarkable alternations of temperature that may be experienced in passing from the sun into the shade, or from a sheltered spot to some street running in a direction north and south. These peculiarities are ascribable to the exposed situation of the town, in the midst of an arid plain elevated 2113 feet above the level of the sea; whilst on the north lies a lofty sierra, from the snowy crests of which the subtile, dry, keen air enters the streets unbroken and but little warmed by the naked land which it has traversed. The mean annual temperature is 57°. The mean range of the thermometer 102°. In the summer of 1839, which the author spent in Madrid,

the thermometer on three occasions marked 112° in the shade, whilst in the succeeding winter there were several consecutive days of skating. The mean daily range for the whole year is about 8°. The actual, as well as the sensible range, on most days, is, however, very much greater. Thierry remarks that an inhabitant of Madrid is habitually exposed to a daily difference of temperature of from 30° to 40°; and occasionally the difference may amount to more than double those figures. We have observed a thermometer which indicated a temperature below freezing point a little after sunrise, and reached 106° in the sun at 3 P.M.; and to this prodigious range a person out of doors would have been exposed within the short space of seven or eight hours.

The mean temperature of winter is 44°, of spring 56½°, of summer 74°, and of autumn 58½°. The mean height of the barometer is 27·8 inches, and the yearly range one inch, one line, and a half. The quantity of rain that fell in 1846, whether as rain, dew, or snow, was only 20½ inches. The number of rainy days, that is, days in which the rain was in sufficient quantity to be measured by the pluirometer, was only 37. The mean term of the hygrometer of De Saussure was 65·9°. Of the winds, the north-east prevailed on 87, the south on 99 days. The vicissitudes of the climate, and the sudden transitions from heat to cold, give rise to numerous complaints, including every form of pulmonary disease; but there are two diseases specially associated with the name of Madrid —colic and pneumonia. The extraordinary rapidity of the progress of the latter, and its fatal character, are the chief peculiarities of that complaint. And it is remarkable that the air which produces these terrible consequences is often so gentle in its movements, that no suspicion of its injurious consequences might be created in the mind of the stranger.

Dr. Francis next describes the climate of Lisbon, which, however, he does not recommend for phthisical patients, seeing that consumption is on the increase amongst the natives, as amongst the Portuguese at Madeira, and that it is one of the most common causes of death. The climate is inconstant. The fluctuations between the extremes of dryness and moisture, and the variations of temperatures, are often sudden, as well as remarkable.

Seville is an interesting city for a winter residence; but its climate is objectionable for invalids in many points of view. The low-lying ground on which the town is built renders it subject to occasional inundations from the overflowing of the Guadalquivir. There is also an open stream which winds round the east and west sides of the town, close to the walls, and falls into the Guadalquivir. In rainy seasons a large current of water runs down this deep channel; but, for the greater portion of the year, it is a sluggish, shallow ditch, full of black decomposing vegetable matter. Much unhealthiness, especially summer and autumn fevers, is fairly ascribable to this source.

Dr. Francis having failed, after repeated inquiries, to discover the existence of any recorded meteorological data at Seville, observes:—"The only alternative, with a view to form an opinion of the climate, will be, to make use of unregistered observations, and *of the valuable information afforded by the state of vegetation.*" Although frost and snow are of rare occurrence, after nightfall and during the early morning, there is a keen,

penetrating feel about the air, which no person with delicate chest should encounter. Nor should he venture out into the narrow streets until the sun has gained some power. In the summer the heat is intense, and rivals that of Madrid. At that season, the upper parts of the houses are no longer habitable. Calmness is a remarkable character of the climate of Seville, when compared with most other places. Storms and thunder are rare, and on many a day in winter not a breath of air is stirring. The prevailing winter wind is the north, which is nearly calm, owing to the influence of the Sierra Morena, which lies in that direction. The hygrometric condition of the atmosphere is not given, nor the amount of rain that falls yearly. Winter, as the term is understood in more northern countries, is said not to exist; although, during the daytime, it may be chilly in the streets and houses, once out in the open country, and there is always a genial, invigorating warmth.

"From time to time, however, and especially in the summer, there prevails the well-known Levante or east wind. This wind, which at the Mediterranean towns is so agreeable and refreshing, is remarkable here for its sultry and nerve-exhausting properties. Having passed in its course over many leagues of parched land, incessantly developing electricity in the glowing sun-light, it becomes to Seville what the north, in a less degree, is to Malaga, what the west wind is to Valencia. When the Levante blows—the sirocco of these parts—people hasten to close their doors, windows, and every other opening, against the entrance of the irritating air. It produces, in those who are exposed to its influence, a burning sensation of the face, renders the whole system feverish and irritable, gives rise to ophthalmias, especially in the case of persons who are predisposed to such affections, and is particularly injurious wherever there is a tendency to nervous disorders. Its effects upon the moral constitution are no less remarkable. During its persistence, the number of quarrels and knife-wounds in the town is almost invariably increased; and I was informed by good authority, that in the administration of justice, allowance is generally made in the case of manslaughter committed under such circumstances. The occasional occurrence of this wind does not, however, at all detract from the sanative merits of the climate of Seville, since no invalid would be counselled to visit the city during the summer, the season in which such winds prevail. But it furnishes a reason, in addition to the heat, why even healthy persons may find it expedient to avoid the city of Figaro during that portion of the year." (pp. 137, 138.)

Dr. Francis disputes the accuracy of Mr. Ford's statement, that the winter of Seville is "very wet," and says, that the winter which the latter writer spent in that city was an exceptional one. The rainy season in Seville usually commences in October, November and December being generally dry. Rain also falls in considerable quantity towards the end of March and in April, and then the sun, being more effectually shut out by clouds than in the winter, the air feels damp and chilly.

"Turning now to the test of climate afforded by the state of vegetation, I will state some facts that came under my own observation in 1848-49, which, I am told, may be viewed as an average season. The process of growth proceeded, although in a diminished degree, throughout the winter. Many kinds of flowers were, at the same time, blossoming in gardens in the open air, and among them, smelling roses were so common, that the gratification of the general taste for weaving them among the hair was indulged in freely by the young women of the poorest class. There were deciduous trees, especially the white poplar (alamo blanco), a great favourite in Spain, the old leaves of which remained green upon the boughs at the same time that the new ones were coming forth. The first great burst of vegeta-

tion, corresponding with our March or April, took place in the second week in January. Then the ranunculus ficaria, one of the harbingers of spring, was in flower, and a profusion of thick herbage already covered the banks and waysides. On the 10th of February, poplars and willows along the river walk were gay with their new full-blown foliage. It may be useful now to compare the above account, in regard to Seville, with what was observed at Malaga at a corresponding period of the year. Journeying from the former to the latter place in the middle of May, the vegetation was found to be much more advanced on approaching Malaga, making every allowance for the four days spent on the road. The cactus was more fully in bloom, the aloe shoots much taller, and instead of showing merely the unexpanded spike-like stem, had already put out some of the lower flowers. The oleander, the flower buds of which at Seville were still in the state of unopened calyx, all along the banks and bed of the Malaga river from Caratracca, were blazing with mature flowers. Then, again, as the valley opened out towards Malaga, the golden tint of harvest was spread over the whole country, whilst several fields of wheat had already fallen beneath the sickle. There was nothing corresponding with this at Seville." (pp. 139, 140.)

The mortality from consumption is estimated at about 10 per cent. Affections of the throat and larynx are not unfrequently met with during the warm weather, and are attributed to exposing the open neck to currents of cool air while the body is heated. The most common causes of death are low kinds of typhus, of which numbers of persons die during the summer.

CLIMATE OF CADIZ.

The almost insular situation of Cadiz, and its exposure to the winds from the sea, which are the prevailing ones, render the climate humid and relaxing. It would be an island, were it not for a long narrow strip of low ground, which extends from the southern point, and connects it with the neighbouring country. Seen a little way off, it seems to rise from the sea, and a more beautiful object cannot easily be found than this city of clear, marbly-white buildings, with its brilliant sky and more intensely blue waters.

"The climate of Cadiz," observes the author, "as might be expected, derives its character in an unusual degree from the marine situation of the town. The annual range of temperature is small; the winters are extremely mild, and the summers temperate. The air, for the most part soft and moist, is more relaxing than it is usually found to be in the southern parts of the Peninsula. At the same time the climate is more changeable than that of Malaga, Cadiz being open on all sides to the winds, without any mountain protection whatever; and although these usually come from the ocean, and are damp rather than cold, it does occasionally happen that the Levante, or east wind in summer, and the north-east wind in winter, visit the town with their ordinary character, as exhibited on the land, but slightly affected by the three or four leagues of sea they have passed over in reaching the city." (p. 146.)

The climate of Cadiz is considered favourable to health and longevity. Señor Igartuburu has published some statistical tables, showing their results. His conclusions are derived from an average of seven years (1838 to 1845). They embrace the whole province of Cadiz. The deaths were 56,000.

There were forty-three centenarians during the seven years, of which twelve occurred in Cadiz itself. The proportion of the women to the men

who arrived at this great age was as 4 to 1. Of the diseases that are found to prevail at Cadiz, the author says, that—

"Pulmonary consumption creates a good deal of apprehension amongst the inhabitants. Many such cases are to be seen in the hospitals, when they present, in the general progress and symptoms, close analogy with what is observed in England, making allowance for a more rapid advance as the summer sets in. According to calculations made during several years, the mortality from this cause is said to be 12 per cent."

Dr. Francis attributes this mortality from phthisis chiefly to the immorality of the place; and, at the same time,

"The changeableness, and that sudden, which its semi-insular situation entails, the chilly and damp air which often blows after a warm day, to be followed in its turn, possibly, by a dry northern wind, render an amount of precaution necessary, which few young persons, whilst in the enjoyment of health, are in the habit of observing."

The climate is, however, recommended for patients with heart-disease, dry asthma, and other affections of the chest in which irritability is a prominent feature.

The mean annual temperature of Cadiz is 62·75°, being two degrees warmer than Rome and Pisa, six than Pau, one than Naples; but colder than Madeira by two, and than Malaga by nearly four degrees. The winter temperature is four degrees warmer than that of Rome or Naples, and six than that of Pisa. The temperature in spring being 60·28°, exceeds that of Rome or Pisa by three degrees, and of Naples by two. The comparatively low annual temperature of Cadiz, the latitude being 36·31°, is to be accounted for by the relative coolness of the summers, the average of which is 73·91°. The mean annual range is 57·7°, the extremes 35·7° and 93·4°. The mean diurnal range is 10, being nearly identical with that of Madeira.

Cadiz is the most rainy place along the Mediterranean coast of Spain. It is even more so than Lisbon. The average number of rainy days is 99, and the quantity of rain 22·6°. The greater portion falls in autumn and winter. It is, however, only relatively to other parts of the south of Spain that the amount of rain at Cadiz is great. Compared with Rome, there are eighteen days more of rain in the latter city, whilst the quantity that falls there is still more in excess. The same may be said of the other chief Italian towns, except Naples, which is about the same. Even at Madeira, the quantity of rain exceeds considerably that of Cadiz. However, sufficient has been shown to indicate that the air of Cadiz is charged with a large amount of moisture. The predominance of the sea winds in all seasons over the land winds, in the proportion of more than two to one, will assist in explaining this.

CLIMATE OF MALAGA.

Dr. Francis paints in vivid colours the extreme salubrity of Malaga, and the comparative immunity of its inhabitants from fatal diseases. Judging from the statements of the author, no other climate of which there are recorded meteorological observations, at all approaches, in a sanitary point of view, the climate of Malaga. He appeals to the equability of the temperature, the longevity of the people, and, as usual, to

the tropical vegetation, as arguments in favour of his statement. Making every allowance for high colouring, there are figures and facts here stated, for the first time, relative to the climate of Malaga, which are remarkable, and deserving of attentive consideration:

"There is no place in Spain," says Dr. Francis, "nor in the whole of Europe, so far as our present information goes, that possesses a climate at once so mild and equable, with so little variation from day to day, and from day to night, as Malaga. Situated in the 36° 43′ of latitude, it is far to the south of any portion of the Italian peninsula, and even of Sicily and Greece. Winter indeed can hardly be said to exist: a perpetual spring, during which vegetation proceeds unchecked, connecting the autumn of one year with the summer of the next. The natives, fully alive to the delicious character of their climate, spend a large portion of their lives, and seek their amusements, in the open air; whilst many of the poor, the whole year through, care for no other bed than such as they can spread after nightfall upon the public walks. Spanish writers vie with each other in describing the praises of Malaga, which seems to them a species of paradise in Andalusia. This is the winter residence which seems to me pre-eminently, among the chosen places of Europe, to promise to the invalid who is threatened with, or already the subject of, pulmonary consumption, in its earlier stage, such relief as change of climate can accomplish for him."

Malaga is built upon a sandy soil that has been reclaimed from the sea, to which it is exposed on the south, having a more or less semicircle of mountains to shelter it in the opposite direction. The author considers the climate to hold an intermediate position, in respect to its effects upon the constitution, between the oppressive and subduing influence of Madeira and Rome, or the stimulating, bracing character of Nice:

"*Temperature.*—The mean annual temperature of Malaga is 66·11°, being warmer than Madeira by two degrees, than Rome and Pisa by six, than Nice by seven, than Pau by ten, than London by sixteen.

"On the other hand, it is colder than Malta by one, and Cairo by six degrees.

"Compared with other places in the Peninsula, it is warmer than Lisbon by five, and than Cadiz and Valencia by three degrees.

"This comparative result as to warmth is due, in some measure, to the intensity of the summer heat, but chiefly to the mildness of the winter.

"Thus the mean winter temperature of Malaga is 54·41°; being six degrees warmer than Rome, seven than Nice, eight than Pisa, thirteen than Pau, fifteen than London. It is, however, six degrees colder than Madeira, four than Cairo, three than Malta.

"It may give a clearer idea of the mildness of the winter of Malaga, if we bear in mind that, in regard to temperature, the month of January, in that place, corresponds with May in London, with June in Edinburgh, with April in Pisa and Rome.

"The mean temperature of spring is 62·55°, being identical with Madeira and Malta, but five degrees warmer than Rome and Pisa, and eight than Pau. The summer and autumn temperatures are 79·38° and 68·67° respectively.

"The mean annual range of temperature is 49°, being many degrees less than that of any other place on the continent of which we possess records; the range at Pau being 68°, at Rome 62°, at Nice 60°. It is surpassed, however, in this respect by Madeira, the range of which is only 31°.

"The mean daily range, which is a point of far greater importance to the invalid, inasmuch as it is that by which chiefly the essential feature of unchangeableness is to be tested, in Malaga amounts to 4·1° only. In this particular we find the climate superior to any of those that have been hitherto noticed; the daily range of Madeira being 9½°, of Rome 10°, of Nice 9°. In connexion with this circum-

stance, it may be observed, that it is far easier for a person in delicate health to guard against variations of temperature from day to day, where they exist, than from similar variations at different periods of the same day.

"The mean difference between the temperature of successive months is 4·95° for the whole year. For the winter months only, in which we are chiefly concerned, it is 2·16°."

The very slight variation, from day to day, of the temperature, of the winds, and of the barometer—the mean point of the latter lying between 27 and 28—and the recurrence of the same figures in the tables of the morning, noon, and evening observations, for twenty consecutive days, would apparently indicate that some error had crept into them. The observations, however, of other gentlemen, including the consul of the place, fully corroborate them. The author estimates the rainy days in the whole year to be 40. In general, the month of May has the largest share of them. Still, owing to other causes, the air is so far charged with moisture, that, in those periods of the year, when the evening temperature is more than usually cooler than the day, a copious fog is seen to cover the plain as the sun leaves the horizon. But Malaga is not perfect, any more than other terrestrial paradises. There is a wind which occasionally blows from an opening in the chain of mountains through which the river Guadalhorce enters the plain, three leagues from the town. This wind, called the "terral," is dry and stimulating, apt to be accompanied with dust, and depresses the sensible temperature, although it does not depress the thermometer. It gives rise to a feeling of restlessness, and of vague uneasiness in the chest, when that part of the body is predisposed to disturbance.

With the view of showing the advantages which the climate of Malaga possesses over that of Madeira for pulmonary consumption, the author observes:

"The prospect of discovering a climate that will fulfil all that can be desired is almost hopeless. Still it may be asserted that Malaga will not afford ground for disappointment, similar to those referred to in the following account, which was given me at Cadiz, in January, 1849, by Commodore B——, at that time commanding the American squadron in the Mediterranean. He had just arrived from Madeira, where he had passed not only the last three, but considerable portions of the last fifteen months, for the relief of slow consumption. He said that for three months past the weather at Funchal had been more frequently rainy and chilly than fine, besides being very changeable; and for several weeks the high mountains near Funchal had been covered with snow, the cold air descending from which influenced very considerably the temperature of the town. In summer the heat was unbearable in the low country. He also complained of the absence of level walking ground, and the general dulness of the place." (pp. 177, 178.)

Dr. Francis now proceeds to expatiate on the vegetation which he considers to have attained its culminating point at Malaga, as regards Europe. This is the only place on the continent of Europe where the sugar cane not only flourishes in the open air, but has long been a plant of extensive and profitable cultivation. The same may be said of the cotton plant. Throughout the winter, hedges of geraniums, as common there as the quickset with us, continue to blossom on the public walks, where they flourish with weed-like luxuriance.

'Malaga la hechicera,
La del eternal primavera,
La que baña dulce el mar
Entre jasmin y azahar,"

The author cites the opinion of the late consul, Mr. Mark, in favour of the climate. Writing in 1829, the latter observes:

"The salubrity of Malaga is surprising and scarcely credible. The population is dense, there is a great deal of misery, the prisons are crowded, and with a depôt of convicts (about six thousand), a badly conducted police, the wonder must be that it is not a sink of pestilence. Instead of that it is, under all these circumstances equally unfavourable, the healthiest place, perhaps, in the world. I speak from thirteen years' experience. Sometimes two or three days pass without a single death throughout the city."*

In alluding to the extraordinary longevity of the people, the same writer says: "Ten died last year (1828) of 100, 102, and 105 years, and many others from 95 to 100. Persons of from 80 to 90 years of age may be seen going about the streets with the full use of all their faculties."

Diseases of the respiratory organs are those for which the climate of Malaga is best adapted. Dr. Francis considers it to be particularly suited for pulmonary consumption, and thinks when it is better known it will become the favourite resort abroad of phthisical invalids. Many persons suffering from incipient phthisis, who had visited Madeira and other highly lauded places throughout Europe, have expressed their preference for Malaga.

If a more bracing air than that of Malaga be required, it will be found about two leagues from this city, in the village of Torre Molinos, the climate of which possesses a more tonic quality. An agreeable summer residence may be found at Ronda, about eleven leagues from Malaga, and more than four thousand feet above the level of the sea.

Almiera, on the shore of the Mediterranean, possesses an extremely mild winter climate. Frost and snow are unknown, and the temperature rarely falls below 50°. The climate is one of the most healthy in Andalusia. The skies are remarkably clear and brilliant, and rarely obscured by clouds. Rain is for the most part of short duration. The air is dry, light, and calm.

CLIMATE OF ALICANTE.

The town of Alicante is situated in a tract of land along the Mediterranean coast, perhaps the driest in Europe. The whole district bears strong resemblance to Provence; but it fortunately has no mistral. The same arid, dust-covered plain, stunted vineyards, and sickly patches of vegetation, are common to both places; but the barrenness of the soil is in Provence the result of the drying character of the prevailing winds, whilst in the district of Alicante it is caused by the absence of rain. "The principal circumstances by which Alicante recommends itself as a place of residence for invalids are, its mild, constant, dry climate, warm nights, comparative freedom from high winds, and general healthiness of the situation." Alicante is situate in the latitude 38° 20′ N., and contains 20,000 inhabitants. There are no meteorological observations recorded upon which to form anything like a precise estimate of the qualities of

* Dr Pinkerton has published an interesting article on the Climate of Malaga in the 'Monthly Journal of Medical Science,' for October, 1853, which modifies the statement of Dr. Francis, but, at the same time, Dr. Pinkerton admits that the Spanish climate possesses many advantages over that of Madeira, or the climates of Southern Italy.

the climate. The author is indebted to an English resident for some tables of the in-door temperature, the result of observations made twice a-day during three years. The mean annual temperature, ascertained in this way, is 63·7°, which is probably below the mean external temperature. The mean temperature of winter is 52·1°. The lowest point which the thermometer indicated during the three years was 46°, the highest 84°, the mean annual range being 36·7°. Snow rarely falls in Alicante; and, although the early part of the day may be chilly, and unfit for the invalid to venture abroad, the middle and afternoon will be mild, calm, and genial. The quantity of rain is very small, and consists for the most part of light fleeting showers. From a series of observations of five years' duration, the average number of days and nights collectively on which rain falls annually is 45, but three days on which a single drop only was seen to fall are included in this number.

As might be inferred from the preceding remarks on the climate of Alicante, nervous diseases are those to which it is particularly obnoxious, and so we find, that apoplexy, the various forms of paralysis, and chronic cerebral diseases, are extremely common: and amongst females, hysteria of a convulsive character is almost universal. Pulmonary consumption is a common disease in Alicante: the local physicians consider that a fifteenth of all the deaths arise from this cause. The type of the disease is marked in the early stage by hæmoptysis. The diseases for which the air of Alicante is most suited are, bronchitis accompanied with copious secretion, atonic dyspepsia, and rheumatism, provided the invalids are not of a nervous temperament, for in that case the air would be too exciting. Notwithstanding the peculiarities of this climate above mentioned, Dr. Francis says that it "offers advantages as a place of residence for persons with delicate chests far superior to any of the places at present resorted to for that purpose." We should be sorry to recommend phthisical patients to sojourn in this Spanish Provence.

CLIMATE OF VALENCIA.

The climate of Valencia affords a good illustration of the fallacy of judging of the salubrity of a place from luxuriant vegetation or warm temperature. If there is a paradise upon earth, Valencia must be that favoured spot, so far as scenery, brilliant skies, and vegetation, are concerned. A Spanish writer, Señor Mellado, says: "Here each church is a museum, each season another spring, each field a beautiful garden; whilst the united attractions suggest to us some happy spot in the lovely vale of Tempe." Cardinal de Retz, while travelling through the great plain of Valencia, two hundred years ago, wrote as follows:

"J'entrai de l'Aragon dans le royaume de Valence, qui se peut dire non pas seulement le pays le plus sain, mais encore le plus beau jardin du monde. Les grenadiers, les orangers, les limoniers, y font les palissades des grands chemins. Les plus belles et les plus claires eaux du monde leur servent de canaux. Toute la campagne, qui est émaillée d'un million de différentes fleurs qui flattent la vue, y exhale un million d'odeurs différentes qui charment l'odorat."

According to Dr. Francis, the above descriptions convey a very inadequate idea of the surpassing attractions of the country to which they refer. He says: "The *pleasing sensations* which everything in external

nature is here calculated to excite, are further heightened by the brilliant skies, proverbial even among Spaniards, and by the glowing light that brightens up the whole." A large surface of evaporating water in the rice-grounds around Valencia, modify the natural dryness of the climate, and, indeed, render it decidedly humid. The prevailing winds also assist in rendering the air damp. They come from the east, over a long extent of sea, and are more or less charged with moisture. The average number of days on which rain fell, in a series of five years, was 38. The local physicians estimate it at 35. Valencia being in the latitude 39·28°, is considerably to the south of the ordinary wintering places for invalids. The mean annual temperature is 63·5°; that of winter, 49·7°; of spring, 60·7°; of summer, 78·8°; of autumn, 65·7°. The mean annual range is 63·8; the mean extremes, 28·9° and 92·7°. The daily range is only 8·7°. January is the coldest month. Snow seldom falls: only three times in fourteen years.

"The springs are delicious," says the author: "the burst of vegetation, the profusion of flowers, and the soft balmy air, both astonish and delight. Such winter as there may have been is suddenly arrested; and in March, vegetation is far advanced. Still the invalid will have to be on his guard against high winds, which in some seasons occur during this month."

Dr. Francis also describes the fertility of the soil, yielding four distinct crops in the year—as wheat, hemp, Indian corn, and beans; and then new crops of oranges.

As might naturally be expected from the vast evaporating surface of the rice-grounds, and consequent humidity of the atmosphere, agues, remittent fever, and rheumatism, are common in Valencia. "The relaxed state of the skin which is apt to occur during a large portion of the year, favours the occurrence of catarrhs, which are common in the summer, and *frequently terminate, when neglected, in consumption.*" The author says that the latter disease is mostly confined to the poor; but Dr. Battles, a local physician, whom he quotes in the next page, says that—"A perceptible increase in the number of cases of phthisis had taken place since the formation of the fashionable garden, the Glorieta, which is much resorted to on summer nights," evidently not by the poor. The same local authority estimates the number of deaths from phthisis at three hundred annually.

The Spanish physicians regard phthisis, in the early stage, as a state of cachexy, in which relaxation forms a prominent feature; and believe the first hæmoptysis to be generally of a passive nature. On the manifestation of the earliest symptoms, they prescribe the removal of the invalid towards the mountains, where the air is more bracing, drier, and aromatized with wild herbs; where the waters are thought to be purer and more highly charged with gas, and therefore less stimulating; and the articles of food of a less watery and more nutritive kind than they conceive to be the case in the low country. The degree of approach to the mountains is made to depend on the season. In summer, they advance boldly amongst them; in colder seasons, favourable situations near their bases are selected. In the autumn, the patient is allowed to eat as many grapes, and as often during the day, as the stomach will bear. Goat's milk, whey, and mineral waters, are also had recourse to. Nervous diseases prevail in Valencia

during the hot weather; and in autumn, fevers are amongst the most frequent causes of deaths. Cholera was extremely fatal in this town; many of the houses were quite depopulated. Valencia is not suited for foreign phthisical invalids. Chronic bronchitis and atonic dyspepsia are the complaints the author thinks most likely to be benefited by the climate.

In the north of Spain, Dr. Francis makes favourable mention of Barcelona, the chief city of Catalonia, and the second in Spain. The climate is temperate, the annual and winter temperature being warmer than that of Rome or Naples, although it lies in a degree of latitude between those places. The average degree of winter is 50·18°; that of summer, 77°. The ordinary annual range is about 48°, the mean extremes being 37·4° and 86°. In a series of fifty-five years, the lowest degree of cold was 24°; and during the same period, the mean annual temperature varied only $4\frac{1}{5}$°. The average daily range is 7·2°, showing the steadiness of the climate. In January and December, it is 5·1°, and attains its maximum 8·6° in May and April. From twenty years' observation, rain falls on an average of sixty-nine days, which is high, compared with that observed in other Spanish towns. Indeed, the inhabitants seem to consider their climate as damp and rainy. The months of April and May are very showery, and the most inconstant in the year. Continued fever, of a typhoid form, the author says, is one of the most common causes of death; and he estimates that about 20 per cent. of the fatal diseases are those of the chest. The climate is recommended for cases of atonic dyspepsia and hypochondriasis, but not for phthisis. Dr. Francis closes his statements of the Spanish climates with that of Barcelona. He recommends, in general terms, as summer residences, the towns of Vigo, Corunna, Gijon, Santander, St. Sebastian, &c.

CLIMATE OF ALGIERS.

If the climate of Malaga is good for cases of phthisis, that of Algiers is better, according to statements of an authentic character, by several observers. The author says: "The climate is very mild and healthy, and well adapted for chest complaints, both those of the heart and of the lungs." The latitude of Algiers is 36·47°; the mean annual temperature, 64°, which is nearly identical with that of Madeira. The actual extremes were 97°, caused by the sirocco, and 32°, which occurred only once in seven years: the difference, 65°, represents the extreme range. The mean temperature of winter is 54°, nearly identical with that of Malaga. The mean of spring is 60·5°; of summer, 74°; of autumn, 68°. Rain fell on fifty-seven days and fifty nights in the year. Sometimes the rain is very heavy, and lasts for thirty-six hours at a time. More falls by night than by day. The prevailing winds blow in two directions—a lower current from the north, an upper from the south.

In summer, the upper current, which is in fact the simoon or sirocco, descends to the surface, in some parts habitually, but at Algiers only occasionally. The effect of this wind upon the human health and upon vegetation is most pernicious. Of course no invalid should remain during the season of this pestilential blast. It would appear from the statements of several resident French physicians, that pulmonary consumption is a disease of extreme rarity in that tract of Algeria which

lies between the sea and the mountains. It is hardly to be met with unless occasionally among the negroes who have migrated from a much warmer climate, and the Jew tailors. Among 1480 patients in the practice of M. Haspel, at Oran, 3 only had consumption: and out of every 138 deaths, 1 only was attributable to that disease. M. Jourdain met with but 13 cases in 8485 patients, and but ten deaths from phthisis in 871 deaths. M. C. Broussais, also, out of 41 deaths in Algeria, had but 2 (1 in 20) from phthisis, while in Paris he met with 1 in 5 from this cause.*

According to statistics furnished by MM. Guyon and Bonafond, it appears that of the deaths which occurred among the civil (European) population of Algiers, during six years, 1 only in 40 arose from consumption. It results from the preceding statements that in every 622 cases of disease, 1 arises from consumption: and in every 75 deaths, 1 only is due to this disease. In Paris and in London the deaths from phthisis are nearly as 1 to 5.

"So that," the author observes, "it is fifteen times more probable that an inhabitant of these cities will die of consumption, than one who resides in Algeria. Even supposing that further experience should very considerably modify the favourable character of these statistics, we should still look in vain in all that has been written about Madeira, for any testimony in favour of its climate, of a nature so comprehensive and so encouraging."

M. Martin, physician to the hospital of the Dey, speaks from long experience:

"That pulmonary consumption experiences much more relief in the climate of Algeria than that of Europe. Not only does it march with a slowness which gives nature time to organize her means of defence, and therefore of cure; but further, in modifying the constitution, it causes the latter to lose the tuberculous susceptibility. Nothing, in fact, is more rare among acclimatized Europeans, than consumption generated in Algiers."

The climate of Algiers is also recommended for cases of chronic bronchitis, chronic diseases of the heart, gout, and rheumatism. All nervous diseases become aggravated under its influence, and the uterine system stimulated in a remarkable degree. The neighbouring climates of Oran and Tangier are incidentally mentioned in a favourable point of view; and the author concludes his volume with an appendix on the mineral waters of the Pyrenees, Vichy, and Aix les Bains.

From the foregoing analysis of Dr. Francis's work, our readers will be enabled to form a pretty accurate estimate of the value of its contents. The author is entitled to the merit of being the first English writer to point out the various qualities of the climates of the Peninsula, in a tangible form; for hitherto our information on the subject was vague and unsatisfactory. It has been long known to the profession that Malaga, in the south of Spain, was considered by Spanish writers to afford the best of winter climates for cases of pulmonary consumption; but until the publication of Dr. Francis's work, the profession (at least those unacquainted with the Spanish language) had nothing but hearsay to guide them in forming an opinion upon the subject. It is to be regretted

* British and Foreign Medico-Chirurgical Review, 1852.

that the author could not obtain authentic and recorded meteorological observations as to the various cities in Spain whose climates he discusses; for, with the exception of Madrid (the worst climate in Europe for the consumptive), Malaga, and Algiers, the meteorological facts upon which the author's opinions are founded are scanty and inconclusive. Indeed, in some instances, he is obliged to have recourse to the tropical vegetation of the soil as a testimony in favour of the salubrity of the climate, because he failed to obtain from the local physicians more substantial testimony; and this we consider to be the chief drawback in the work.

The author's description of the climate of Malaga, and the data upon which his views in favour of its sanitary qualities are based, are, however, sufficiently precise to merit the attention of the profession. Indeed, if the statements made by Dr. Francis are further corroborated by subsequent observers, and become generally known amongst the profession, Malaga will become a formidable rival to Madeira, as an equable and genial climate, suited for consumptive invalids, if it does not eclipse it altogether. In taking leave of Dr. Francis's book, it is only just to the author to state that we have derived both pleasure and information from its perusal.

Thomas H. Burgess.

Review II.

1. *Grundzüge der Pathologischen Histologie.* Von Dr. Carl Wedl.—*Wien*, 1854.

Outlines of Pathological Histology. By Dr. Charles Wedl.—*Vienna*, 1854. pp. 825.

2. *Kompendium der Pathologischen Anatomie, als Anleitung zum Selbststudium.* Von Dr. Theophil Wislocki.—*Wien*, 1853.

Compendium of Pathological Anatomy, as a Guide to Self-instruction. By Dr. Theophilus Wislocki.—*Vienna*, 1853. pp. 472.

The appearance of these works, written by two Viennese physicians, one of whom (Wislocki) is junior assistant to Rokitansky, affords us an opportunity not only of glancing at the present doctrines of that celebrated school of medicine, but of describing the method in which the pathologico-anatomical and medico-legal inquiries are conducted. As the founder of the Viennese school, the name of Rokitansky is known even to the junior student; his work is referred to by the teacher and practitioner; his uninterrupted and successful search after truth has gained for him the highest honours the University can confer, and secured to him a reputation so wide as falls to the lot of but a few. Those who know him well, or can claim the high honour of his friendship, will agree with us, that Rokitansky as a professor is only inferior to Rokitansky as a man. With such a master, then, much should be expected from the Viennese school; and the works before us are the only ones that have issued from it on this subject since the publication of the 'Handbuch der Pathologischen Anatomie.'

The extent of the subjects included under pathological anatomy and histology, renders it impossible for us to discuss the value of the opinions that our authors entertain on particular subjects. The different sections

of Dr. Wedl's work, together with articles by other observers, will form subjects for reviews on the different pathological changes which the tissues undergo. It is, however, our duty to give such a general idea of its contents, as will enable the reader to judge whether the opinion which a careful perusal has led us to form of this work as a whole be well-founded, or the contrary. But before doing this, we shall take the opportunity afforded to us of glancing at

The Pathologico-Anatomical School of Vienna, and the Austrian Regulations regarding Medico-Legal Inquiries.

A patient has just died in one of the wards of "das allgemeine Krankenhaus." The body must remain in the bed for two hours, during which time a physician of the second class has inspected it, to ensure that the individual is dead, before the porters are ordered to remove it to the dead-room. This is effected by placing it on a mattress in a cot, the shape of which is exactly similar to that of the cradles used in our hospitals to keep the weight of the bed coverings from injured limbs. Over the hoops that form the top, canvass is stretched, and as the entire top is attached to the bottom by hinges, it can be opened, and the body laid within. Two porters then carry it to the dead-room, and with it a ticket of this form:

The dead body of ....
from ward No. ...., bed No. ......, at .... o'clock, ... died
at .... o'clock, ... inspected
is at .... o'clock, ... removed
to the dead-room. .... the ......th, 185 .

.... signature of the physician who inspected the body.

Hour of reception of the body.
....
.................., dead-room porter.

In the dead-room is a series of wooden couches, on one of which is laid the body, covered with a woollen cloak and cowl. Over the head of each rests a gong-bell, the hammer of which commences to strike as soon as a weight, attached to it, is thrown off its balance. A cord is so applied that the slightest touch removes the balance; the weight begins to descend, and the bell alarms loud and long. To the fingers of the right hand of the corpse the other end of the cord is fastened by loops; and any return of animation, such as could cause the least movement of the hand, would be followed by an alarm, in answer to which immediate assistance would be given by the porter, who is on the watch, night and day, in an adjoining room. For the past twenty-three years no hand, save that of a visitor or a porter, has ever moved these cords.

After having lain in the dead-room during twenty-four hours, the body is carried to the autopsy-house, situated at but a few yards from the room last described, placed upon a smooth stone table supported on a wooden frame. A ticket of the following kind, sent down from the ward in which the person died, is at the same time laid upon the desk.

IN THE ROYAL IMPERIAL MIDWIFERY AND LUNATIC ASYLUM, Died On the ......th ...., 185 , at ...... o'clock,		
In ward	No.	Under reception No. ......
Name		
Age, Religion, Married, or Single		
Occupation		
Disease		
OBSERVATIONS.		
Vienna, the ......th ...., 185 .		

At eight o'clock in the morning, Dr. Heschl, the senior assistant, commences the post-mortem examination. Every organ is examined, and that thoroughly, while the operator describes, and the junior assistant transcribes, the appearances. Should Dr. Heschl be absent, which very rarely occurs, one or other of the junior assistants, Drs. Planer and Wislocki, conducts the autopsies. On the table stands a basin of water, into which the operator constantly dips his hands and instruments; and a vessel of the form of a garden watering-pot, without the rose, is constantly in requisition, as by it a stream of water is poured over the cut surfaces of the viscera, thereby removing all blood, &c. Unimportant as these details may seem to those who merely look on at the examination, they are most simple, cleanly, and useful adjuncts to the operator. The room (lit from the roof) in which these autopsies are made, is much too small, and so ill constructed that only those who stand near the table can see the morbid parts as they are taken from the body.

Should the English visitor have overslept himself on a morning when a body from one of the medical clinical wards is to be examined, the crowd of students who have followed Skoda, or Oppolzer, to the dead-room, is so great that the visitor had better pass on to the next door, and enter the smaller room in which Professor Rokitansky conducts the medico-legal autopsies. If a death has occurred in the city, or in the hospital, under circumstances such as render an inquiry necessary, the body is brought to this room, and is examined by Rokitansky, in the presence of the Professor of Medical Jurisprudence, and an officer appointed by the State to attend at such investigations. The students of

jurisprudence and medicine witness these autopsies, unless the death has been caused by hydrophobia, when, by an old statute, no students are allowed to be present. This ridiculous regulation was, we presume, founded on the belief that the disease could be communicated by contact with the body or the saliva, and is probably not enforced. Two assistants aid in making and recording these autopsies, the expense of which, when conducted *ex causâ publicâ*, is paid by the civil authorities. The account of the examination, written at the dictation of the professor, is read and signed by him, after which it is countersigned by the civil officer that is present, and is forwarded the same day to the authorities. The opinion thus given as to the cause of death, is final; and the civil authorities act according to it.

It matters not from what cause, or under whatever circumstances, a case of sudden or violent death occurs—a medico-legal inquiry is instituted, and a complete autopsy must be made; the examination is, however, deferred until forty-eight hours have elapsed after death, unless in a few exceptional cases. Further, it is required of every physician who, under any circumstances, examines the body of one that has died a violent or a sudden death, caused by an accident or otherwise, that he shall immediately inform the authorities of all the particulars connected with it—under a fine of from eight shillings to two pounds. In order to prevent an examination being made before the expiration of the legal time (forty-eight hours), it is enacted, that any one writing a false hour on the death-certificate, shall be liable to imprisonment for from one to six months.

Whenever any one dies in Vienna, or in any other part of the Austrian monarchy, the physician who has attended the case fills up a form similar to that given at page 312, the first two lines being, of course, altered to suit the name of the place where the death has occurred, which is sent to the police-office. In the event of a physician not having been in attendance, the relations of the dead, or those in whose house the body lies, must inform the authorities thereof. Thus the police get daily information of all the deaths occurring in their district: and a medical officer, appointed for the purpose, inspects the bodies, and reports upon them. Permission is then given to bury the body, and without it no one can be interred. In all cases, forty-eight hours must have elapsed before the interment can be made, but this interval can be shortened should an epidemic prevail. If there are marks of violence upon the body, or other suspicious circumstances in any way connected with the death, the inspecting physician reports accordingly, and precautions are immediately taken to prevent the body from being removed. An order is then given to convey the corpse to the hospital for legal dissection, whither, two hours after sunset, it is conveyed in a cot similar to that already described; and, after the autopsy has been completed, returned to the friends for burial. Under certain circumstances, this examination can be made in the house in which the body lies; but this applies to places only, near which there is no public hospital.

Has any one been received into hospital, and died there under circumstances which render it advisable that the cause of death be legally inquired into, the following note is sent to the authorities, and an order to make the examination is returned:

NOTE.

The honourable magistrate is respectfully requested to be pleased to authorize the legal examination of the body answering to the annexed official medical description.

.... (name), aged ......, born in ...., residing in ...., who, on the ...... of ...., 185 , was received into this institution under journal No. ......, died on the ...... of ...., 185 , in ward No. ......, and on account of ...., to legal examination.

Physician's signature, ...

Royal Imperial Hospital Office,

Vienna, ..., 185 .

These are some of the most important regulations respecting the examination and burial of the dead; and, as far as regards the manner in which the medical part of the inquiry is conducted, the regulations in force in Austria are superior to those in this country.

There is evidently much that requires remodelling in the medical department of our coroners' inquests. As regards the physician who had attended the case during life, and formed his opinion of its nature before death, the impropriety of allowing him to make the post-mortem examination must be evident, inasmuch as his preconceived opinions necessarily influence his view of the pathological appearances found in the dead body. Again, as the physician, engaged in everyday practice, but rarely conducts an autopsy, how incompetent must he be to give evidence in which is involved the best interests of society, as well as of the individual charged with the commission of a crime.

In a former number, we have endeavoured to show that prostitution calls urgently for legislation. A similar remark applies to medical evidence on legal inquiries into the cause of death. We can bring forward instances that have fallen under our immediate observation, in which but one of the great cavities of the body was opened, and the viscera contained therein looked at, not examined; cases in which the words "to the best of my opinion" expressed—as far, at least, as the medical witness was concerned—the truth of the evidence as to the cause of death, but in nowise corrected the misstatements he had made. We do not fear to state most deliberately, that the cause of justice is frequently frustrated at our coroners' inquests—first, by the medical witness's incompetency to judge of, or reason correctly on, the diseased appearances that may present themselves in the dead body; or, more frequently still, from the second cause—namely, his examining but one cavity, or not knowing the manner in which a *complete* autopsy ought to be made; and, lastly, from the coroners observing—"It is unnecessary to make a post-mortem examination, as the medical witness is of opinion that the injury visible on the surface of the body is sufficient to account for the death." We do not assert that these exact words were ever used, but any one, whether professional or non-professional, who has attended two or three inquests, must have heard a similar observation, or noticed cases in which the propriety of making an autopsy never occurred to either the coroner, who was a lawyer, or to the most important witness, who was a physician or a surgeon.

It is certainly remarkable, that in this country, which has produced so many great medico-legal authorities, and in which the cause of death can, on occasion, be tracked out with such surpassing ingenuity, the greater

number of coroners' inquests should be so imperfectly conducted. The same defect exists here as throughout the whole English system of medico-legal police and state medicine. It is not too much to say, that in these subjects, civilized England is semi-barbarous, and is infinitely behind many of the continental nations whom we do not think at all our equals in most of the arts of peace or war.

Whenever an official inquiry is made regarding coroners' inquests—and the sooner such an investigation is begun the better will it be for humanity and the credit of the country—the defects in the present system will, we believe, become so evident, that the legislature and the public will wonder how such things could be. If the causes of death under suspicious circumstances are to be inquired into, it is but reasonable to expect that such investigations shall be made conformably with the spirit of the nineteenth century, and not as in the seventeenth or eighteenth. Englishmen have been touring it all over Europe, importing foreign goods and foreign fashions, but the sanitary regulations of the Continent appear to be considered valueless, and unworthy of a place in their trunks. It is high time to bring home some of the useful lessons that can be learned within a few miles of London. War even can be no excuse for deferring our examination of the sanitary systems of the Continent; the materials are before us, and to them we shall, at a future time, return. Meanwhile, time has been passing; it is twelve o'clock in Vienna; and Rokitansky's lecture room, No. 78, in the first yard of the hospital, is filled with students. Here, during the winter session, the professor, following the order of description given in his great work, lectures on general pathological anatomy. In the summer months, special pathological anatomy forms the subject of the course. These lectures must be attended by all students of medicine, and the fee is sixteen shillings. During the last quarter of the hour, the professor demonstrates the abnormal parts found at the autopsies in the morning. The pupils of this course attend in the dead-house on Mondays, Wednesdays, and Fridays, at from three to four o'clock, when they, in turn, make an autopsy, and describe aloud the condition of the organs, receiving from Dr. Planer such direction and instructions as they require. In this manner, the student acquires most valuable practical information. In the winter session of 1851-52, the number of students attending this course was 350; in the summer of 1852 it amounted to 342; and in 1852-53, there were 236 attending.

In addition to the official course just described, pathological anatomy is taught privately by Dr. Heschl, in courses of from thirty to thirty-five lectures. They are delivered five times a week in the dead-house, at from ten to eleven o'clock during August and September, from half-past one to half-after two during the other ten months. The course consists of a series of demonstrations and observations on the diseased appearances found at the mornings' dissections; and, under the direction of the lecturer, each of the pupils—who are generally foreigners—makes a post-mortem examination. The last few days of the course are occupied in visiting the pathological museum. Fifteen to eighteen persons attend each course—the fee to which is thirty-four shillings.

To those who visit Vienna, and are desirous of studying pathological and physiological histology, the course given by Dr. Wedl affords a good

opportunity. It is delivered at the lecturer's residence, No. 206, Alsergasse, near the hospital. The hour of attendance is regulated so as to suit the majority of the class. The number of students in each course is limited to five, each of whom is provided with a microscope. The supply of specimens obtained from the hospital is almost unlimited. Each pupil chooses the branch of histological research he desires to follow out; and a fee of one pound is charged for fifteen lessons of about an hour each. Dr. Wedl also gives a theoretical course as soon as a sufficient number enter to form a class.

The following statistics, which we have obtained from the yearly reports and manuscript records of the hospital, give an accurate idea of the vast opportunities which this school affords for the study of pathological anatomy:

In 1848 the number of autopsies was	1069
In 1849 " " "	1366
In 1850 " " "	1414
In 1851 " " "	1434
From October 1st, 1852, to January 31st, 1853	401
From November 1st, 1817, to January 31st, 1853	32,301

The medico-legal autopsies, averaging two daily, are not included in this report.

From a school so rich in materials has emanated Dr. Wedl's 'Outlines of Pathological Histology,' which is divided into a general and special part. The work opens with a definition of the objects of pathological histology, its relations to pathology, and the means by which it is studied. Under the latter head is given a concise description of the microscope, the application and uses of the auxiliary instruments, together with some general remarks on injecting, drawing, &c. The general pathological part is considered under seven heads: first, alterations in the circulation; second, alterations of normal cells; third, pathological new-formed cells; fourth, formation of fibres; fifth, formation of areolar tissue and papillary new formations; sixth, formation of vessels; seventh, formation of cysts.

In the first of these divisions are considered the results of experiments upon animals, as affording a means of judging of alterations in the circulation. Hypertrophy, atrophy, and congestion are next briefly noticed, and then serous (hydropisches), fibrous, albuminous, and colloid exudations. Next in order are the alterations which the products of exudation undergo, considered in their re-absorption, the formation of pigment in it, fatty, calcareous, gangrenous alteration of the exudation, and finally, increase of the normal elements of the blood closes this first division of the general pathological part. Under the second head, the author offers some general observations on the atrophy and degeneration of the contents, wall, or nucleus of cells, or of the intercellular substance, and concludes this division of the subject with a few remarks on the theory of atrophy and hypertrophy. The development of new-formed cells, by division of the cell wall and nucleus, their relative size, the atrophy of pathological cell-structures, and the connexion which exists between new-formed cells and the areolar type of tissue, express the most important divisions of the third group. The subjects of the fourth, fifth, and sixth divisions have

been already mentioned; and with Rokitansky's views on the formation of cysts, the first general part of this work closes.

From a careful perusal of the first hundred and four pages, we have been confirmed in the opinion, that in the present state of science it is premature to attempt to write a general pathological histology. So Herculean a task requires, for its completion, not only a minute and extensive knowledge of the microscopic alterations produced in all tissues, by diseased action, but it presupposes that their connexion and relation to each other have been in some degree demonstrated. It implies that the laws which regulate physiological formations have been proved to be the same as those which regulate pathological productions, or that a new series of laws have been discovered. The general tendency of histologic research is to accumulate rather than to arrange; hence, were we in a position such as would enable us to write a special pathological histology, even so detailed a knowledge would be insufficient to enable us to lay down the general principles of the science, unless the changes had been observed seriatim, and a law had been deduced from these observations, or a comprehensive theory formed, round which each pathological formation would find its proper place. The time, then, for writing a general pathological histology has not yet arrived, inasmuch as the raw materials necessary for the completion of such a work have not yet issued from the various workshops of histological science, while, in the work before us, the author has not allowed himself space sufficient to enable him to notice the opinions of even all the leading authorities.

To the student the perusal of this first part of the work will be highly instructive, as it contains a readily understood expression of the leading opinions of well-known pathologists. The practitioner will be pleased to find by it that pathological anatomists generalize in a manner somewhat similar to that pursued by his teachers of pathology. Many will, we doubt not, consider that its perusal has satisfied them, that they have not lost much by having ceased to read since they closed the, then just published, master-works of Rokitansky, Vogel, Andral, or Cruveilhier.

Those who have kept pace with the pathological histology and chemistry of the last few years, will find the second part of this work much more valuable than the one just described. In the special part all pathological formations are divided into six families. The first of these, on "organic formation," includes the deposits that occur spontaneously, or can be produced, in urine; the oleaginous, the pigmentary formations, together with concretions. The description is concise, yet explicit, woodcuts give the characteristic forms, the action of reagents is fully given, and in most cases we find the quantity of the angles of the crystals as given by C. Schmidt. We may here observe that the value of goniometry appears to be lost sight of, at least in this country, yet it supplies us with one of the most valuable means of diagnosing the character of crystals. Under the second family we find "the atrophies," including atrophy of the blood, or the changes which it undergoes before being absorbed, after its escape from the vessels, or when it becomes impoverished while passing through the system: atrophy of fat cells of areolar tissue (*bindegewebe*), of cartilage, bone, muscle, vessels, of skin and mucous membrane (the latter as described by Engel), atrophy

of lung, including emphysema and bronchiectasis, atrophy of the teeth, liver, blood-glands, kidney, female organs of generation, including the mammæ, atrophy of the nerves and of the eye.

The third family includes "the hypertrophies" of the fatty tissues, with the microscopic appearances of warts, corns, nævi, and ichthyosis, hypertrophy of areolar tissue of muscle, of the blood, forming lymphatic and other glands. The fourth family, "the exudations," comprises the products of exudative (Wedl expresses by this term inflammatory) action on serous membranes, on the skin, mucous membranes, vessels, bones, muscles, blood-glands, lungs, liver, kidneys, sexual organs, brain, spinal cord, and eye. According to Wedl "the most striking act of inflammation consists in the increased transudation of blood-plasma through the unwounded walls of the vessels of an organ. We call this process 'exudation,' and its product the 'exudate.'" Yet under this head we find pericarditis and peritonitis considered in the same category with ossific and calcareous exudations on serous membranes; variola and hæmorrhoids are ranged under exudations on the skin; ætheromatous deposits, endocarditis, and phlebitis, form another group; while ostitis, yellow atrophy of the liver, fatty degeneration of the epithelium of the kidney, yellow and red softening of brain, iritis, are all included under the general head "exudation." Such heterogeneous grouping may be found convenient for the purposes of description, but cannot be considered entitled to the denomination of a scientific classification.

The fifth family, "new formations," is arranged in ten subdivisions.

1st. Granular cells, granular bodies, and granular masses.

"From a comparison of these three categories it results, first, that the granular cells (*Körnchenzellen*) are a fatty degeneration of original or new-formed cells; the granular bodies (*Körnerkorperchen*) are a collection of fatty molecules around a previously formed nucleus; the granular masses (*Kornerhaufen*) are simple aggregations of fat granules. Second, that the granular cells, after the disintegration of their cell-walls, are no longer distinguishable from the granular bodies; and when the nucleus of the latter is no longer observable, it becomes identical with the granular masses." (p. 340.)

The second subdivision of the new formations is pus. The third, tubercle. The fourth, new formations in typhus products. Fifth, cellular (fibrous?) new formations as they occur on serous membranes, on the skin, as for example, in condylomata, elephantiasis, &c., in the intercellular tissue of muscle, on mucous membranes in the form of polypi, in the thyroid gland, in the liver and kidney under the form of cirrhosis, &c., in the bones as osteo-sarcoma, in the breast as cystic-sarcoma, &c. The sixth sub-division comprises the new formation of fatty tissue as in lipoma; the seventh, cholesteatoma; eighth, new formation of cartilaginous and bony structures, including enchondroma, the reparative process in cases of fracture, the changes which occur in exostosis, in calcareous formations, &c. Ninth, new formation of tooth substance. Tenth, cancer, under which will be found examples of this formation in almost all the tissues of the body, together with a description of their general and microscopic characters. Lastly, the sixth family includes the parasites, which are divided into vegetable and animal parasites, infusoria, arachnidæ, and insectæ.

Such is the general plan of the work. The reviewer's task, of forming a general estimate of a scientific work, is rendered comparatively easy if he has had such a personal knowledge of its author as enables one man to form an opinion of the mental powers of another. Thus assisted, we entered upon the perusal of Dr. Wedl's work, with the certain knowledge, that he had for years observed before he took pen in hand; not that this, though the most important, is the first addition he has made to histological science;* but those who study this work will, before they have turned many pages, perceive that they are following the observations of a practical histologist. Hence, the most prominent feature of the work is, that it is the offspring of the author's carefully made observations.

Those who expect to find it to be a manual of pathological histology will be disappointed, for its aim and character are much higher. Many British observers will look in vain for reference to their labours; while those who are engaged in the study of histology will find that this work's proper place is on the table next their microscope, rather than on their library shelves. It is the first work of its kind that has, as far as we know, issued from the press; and it has gained for its author a prominent position in that most honourable corps, the German pathological histologists.

The woodcuts, two hundred and three in number, are excellent, for they are truthful; while the paper and type are so good, that the work forms one of the very best got-up books that have issued from the Viennese press, and yet it is without an index.

Should our Polish friend, Dr. Wislocki, glance over these pages, as before many weeks have passed they will be upon the table of the library of the Royal Society of Physicians of Vienna, he will fear that we have forgotten him, his work, and, what would be equally inexcusable, the many pleasant hours we spent in reading German and English together. Our memory is not so remiss. We have found his book to be what it professes, "a compendium of pathological anatomy as a guide to self-instruction." As such it is eagerly bought by the students of Vienna, for Rokitansky's great work, even were it not out of print, is too voluminous for their use; and Wislocki's manual, translated into Polonnaise, has become a class-book in Cracow. We recommend it strongly to those students who are acquainted with the German language. It is, perhaps, too elementary a work to be of much use to teachers of morbid anatomy.

T. S. Holland.

* Beiträge zur Lehre von den Hämatozoen, von Wedl. 1849.
Ueber die traubenformigen Gallengangsdrusen. 1850.
Beiträge zur Anatomie des Zweibuckeligen Kameeles (Camelus Bactrianus), von F. Müller und Wedl. 1852.
Besides the above reprints from the Transactions of the Royal Academy of Sciences Vienna, many articles by Dr. Wedl are to be found in the Zeitschrift der k. k. Gesellschaft Aerzte zu Wien.

REVIEW III.

An Inquiry into the Pathological Importance of Ulceration of the Os Uteri; being the Croonian Lectures for 1854. By CHARLES WEST, M.D., Fellow of the College of Physicians, Physician-Accoucheur to St. Bartholomew's Hospital, and Physician to the Hospital for Sick Children, &c.—*London*, 1854. pp. 95.

OF late years, diseases of the uterine system have attracted their full share of attention, and our knowledge of the subject has, doubtless, been very much increased, but it has been accompanied by one very serious drawback—viz., the conflicting opinions which have been put forth upon what seemed to be a very simple matter. Even when divested of the cloud which controversial acrimony has thrown over them, the statements are so positive, and yet so extremely divergent, that it is no easy thing for those whose experience has made them familiar with the subject to arrive at a satisfactory conclusion; and for ordinary practitioners it is all but impossible. In this confused state of affairs, the profession will welcome the labours of any man which may assist them to determine on the frequency, and appreciate the importance, of such diseases; much more so when that inquiry is conducted with calmness, with a freedom from personal acerbity, with a minute and careful investigation into all the circumstances of the case, and with an adequate knowledge of pathology generally, and of uterine pathology in particular. To this praise the work of Dr. West is fully entitled: we have derived both instruction and pleasure from its perusal, not merely on account of its scientific merits, but from the full, fair, and gentlemanly manner in which it is written. As its title indicates, it is confined to this one particular point in uterine pathology. In this present article, our space will permit little more than a brief abstract of Dr. West's inquiries, with some comments thereupon.

The question to be examined, as stated by Dr. West, is—

"Whether ulceration of the os uteri is to be regarded as the first in a train of processes which are the direct or indirect occasion of by far the greater number of the ailments of the generative system; or whether, on the other hand, it is to be considered of slight pathological importance and of small semeiological value—a casual concomitant, perhaps, of many disorders of the womb, but of itself giving rise to few symptoms, and rarely calling for special treatment." (p. 14.)

In thus stating the question, it will be observed that Dr. West follows the lead of the advocates of the first proposition, and regards what he and they call ulceration of the os uteri as not only a primary, but an isolated affection of this part; and further, it should be remembered that, in certain treatises, it has been latterly maintained that as many as 81 per cent. of all women presenting symptoms of uterine ailment are suffering from inflammatory disease of the tissue or canal of the cervix uteri, and 70·4 per cent. from ulceration of the os uteri. It may assist our readers if we state, at the outset, that Dr. West's researches have led him to the second of these conclusions—viz., that the disease is neither so frequent nor of so much consequence as has been believed by many. We are not sure that his conclusions might not legitimately be pushed even further,

and the inference be fairly drawn from the data, that ulceration, &c., is scarcely of any consequence at all.

The steps by which Dr. West conducts the investigation seem very fair, and certainly the spirit in which it is pursued is candid and philosophical. The inquiry divides itself into four branches: first, how far the extreme views of the importance of ulceration of the cervix uteri are borne out by its anatomy and physiology when healthy; secondly, whether post-mortem examinations show the disease to be frequent and extensive, or the reverse, and with what changes in the cervix it is combined; thirdly, what are the results of ulceration in procidentia uteri, and how far they illustrate the present question; and fourthly, what conclusions are to be drawn from the clinical history of ulceration of the cervix uteri.

1. As to the inference from the anatomy and physiology of this portion of the uterus, Dr. West differs—and we think, rightly—from those who state that in health the cervix "receives a greater amount of blood, and that it is endowed with a higher degree of vitality than other parts of the organ." We find that, at puberty, it is in the body and not the cervix that the greatest development takes place; and also during gestation and after delivery, it is in the body that the most striking changes occur; the cervix participating, doubtless, but in a secondary degree.

"The cervix is less sensitive than the body of the uterus; the sound which passes along the former, almost unfelt, generally finds the lining of the uterus acutely sensitive. The cervical canal has been forcibly dilated; it has been incised; the tissue of the cervix has been burnt with the strongest caustics, or with the actual cautery, or portions of it have been removed with the knife;—generally with no injurious consequences, often with so slight a degree of constitutional disturbance, or even of local suffering, as to surprise those who advocate, little less than those who condemn, such proceedings."

Therefore, continues Dr. West—

"If structurally so lowly organized, if physiologically of such secondary importance, if so much less subject than the body of the uterus to alterations in its intimate structure, and if so comparatively insensible even to rude modes of therapeutical interference, it certainly does appear to me that the assumption, that some slight abrasion of the mucous membrane covering this part is capable of causing a list of ills so formidable as are attributed to it, ought to rest for its support upon some other and stronger foundation than any inference fairly deducible from anatomical or physiological data." (p. 21.)

Dr. West, however, candidly admits that no inference from such data can be conclusive against positive facts; it may show the probability or improbability, but little more.

2. The results of indiscriminate post-mortem examinations of females have been variously stated. M. Lair found twelve ulcerations of the cervix uteri in 500 cases, and M. Pichard five in 300. The examinations at St. George's Hospital are said to have yielded much the same proportion. Dr. West rejects these examples, on account of their indefiniteness as to the character, extent, and nature of these lesions, and the absence of any information as to the age of the patient, and other matters which have an important bearing upon the question; stating, also, what is very true, that "appearances, the most striking characters of which consist in increased vascularity, and in that vital turgescence which disappears soon

after life has departed, cannot be expected to be very marked some days after death." In this dilemma, Dr. West has recourse to sixty-two observations of his own, noted with great care; and though too few to justify an absolute conclusion, we are inclined to think they represent the usual proportion pretty fairly:

."Of the total number, 13 were above forty-five years of age, the remaining 49 between the ages of fifteen and forty-five. Concerning all of the former class and 30 of the latter, making a total of 43, it was either known with certainty, or concluded with great probability, that they were married, or had had sexual intercourse; the remaining 19 were believed to be virgins."

Of the 62 cases, the uterus was healthy in 33, and diseased in 29, or somewhat less than one-half. Of these 29 cases, there was ulceration of the os uteri in 17—i.e., it existed alone in 11, with diseased lining of the uterus in 3, and with induration of the walls of the uterus in 3 cases. Again, there was induration of the walls of the uterus without ulceration of the os, in 7 cases.

"The os uteri was abraded in 1 of the subjects above forty-five years of age, and the lining of its interior was diseased in 5 of that number. In 11 of the 19 patients, all under forty-five years old, who were virgins, the uterus was perfectly healthy; in 8 it presented some sign or other of disease. This consisted five times in slight abrasion of the os uteri, which existed alone in 3 cases, but was associated in the other 2 with some morbid state of the interior of the womb. Twice the interior of the uterus was the only part affected; and once the uterine walls were much harder than natural." (p. 24.)

It must be remembered that these were patients who had died without any complaint or suspicion of uterine disease; so that, far from being surprised, as Dr. West expresses himself, at more than one-half of the cases exhibiting no disease of the uterus, we think it remarkable that the proportion of disease was so great, so much beyond the results of any former examinations, and probably beyond what would be found to be the case with any other organ in the body. This table affords us no means of judging of the comparative frequency of ulceration and other diseases.

Dr. West regards the usual explanation of the mode in which induration of the cervix is produced as "purely imaginary;" and we are quite prepared to admit that it is unsatisfactory to regard it as the direct consequence of ulceration.

"It existed in 9 cases; in 5 of which it was not associated with any other disease of the uterine substance; in 3 it co-existed with ulceration of the os; and in 1 with a morbid state of the interior of the uterus. . . . . It appears, then, that most marked induration of the tissue of the cervix and of part of the body may exist where there is no trace of inflammation, either past or present. It may also occur in connexion with inflammation and ulceration of the lining membrane of the cavity."

Ulceration of the os uteri, and induration of the uterine walls, were associated in 3 instances; in one it was slight, in another extreme, and in a third considerable, with a distinct line of congestion about half a line in depth, between the ulcerated surface and the pale tissue of the indurated cervix.

From the results afforded by this branch of the inquiry, Dr. West rejects the opinion that ulceration is the frequent and formidable malady

it has been represented, and that it is the cause of the secondary alterations attributed to it.

"We have seen that, in by far the majority of cases, the ulceration, when present, was not merely trifling in extent, but that it had not given rise to so much irritation of the neighbouring tissues as to produce any appreciable congestion of the mucous membrane in its vicinity, while the changes in the uterine substance, alleged to depend upon it, were oftener present without, than in connexion with it: and, moreover, none of the alterations about the os and cervix of the womb were so considerable as those which were apparent in its cavity." (p. 31.)

3. But in cases of complete prolapse of the womb, we have an opportunity of witnessing not merely the existence and course of ulceration, but the inconveniences to which it gives rise. Now, do these inconveniences answer to the description given of those produced by ulceration in recent works on this subject? Let us hear Dr. West:

"These ulcerations are generally indolent, though by no means so much so as the ulcers of the inverted vagina itself, which are apt to become deep and excavated, with raised and callous edges, and exactly to resemble chronic ulcers of the skin of the other parts of the body. The abrasions of the os, however, after weeks or months, still retain much the same characters as they originally presented. They extend, indeed, at one time over a larger extent of surface than they occupy at another; but they very rarely increase in depth, or extend to the subjacent tissue. The ulcerated surface is denuded of epithelium; now and then it is partially covered by a thin layer of yellowish lymph, but usually it is of a rather vivid red colour, and of a granular appearance. This granular character is generally more marked in proportion to the age of the ulceration; while in a few instances the granulations are distinct from each other, rather elongated in form, and look like elongated papillæ. A transparent albuminous secretion in general covers the ulcerated surface, and is sometimes poured out freely from it, but there is seldom any abundant secretion from the interior of the uterus, or even from the canal of the cervix." (p. 35.)

In addition to these superficial erosions, we occasionally find deeper ulcers; and where the prolapse has continued long, there is more or less hypertrophy, not from new tissue deposited, but simply from overgrowth of the old. Now, these changes neither give rise to the symptoms which have been attributed to ulceration, nor do they prevent, in certain cases, the fulfilment of the uterine functions of conception, gestation, and labour, with no increase of inconvenience.

So far these facts are opposed to the opinion of the frequency and importance of ulceration of the os uteri, so far as the illustration may be considered a fair one; but Dr. West, with great fairness, points out a modification of such a conclusion:

"But though it be conceded, as, I think, it must be by all observers, that the symptoms supposed to characterize inflammation of the neck of the womb and ulceration of its orifice are not met with either constantly, or in a special marked degree, in cases of prolapsus or procidentia uteri; still we should not be justified in drawing an absolute conclusion from what we observed in the misplaced uterus, as to the effects produced by similar ailments attacking the organ when in its natural position. It may be alleged, and with plausibility, that during the gradual process of its misplacement, the sympathies of the womb have been rendered less keen than they were while the organ retained its natural position; and that thus it comes to bear, with comparative impunity, injuries which might otherwise have produced great disorder of its functions, and great alteration of its tissue."

No one can doubt the truth of this remark who has witnessed the slight impression made by deep ulceration of the prolapsed organ: in a case which came under our care, there were five ulcers into which the point of the finger could be inserted, and which penetrated nearly through the walls of the uterus; yet the patient suffered nothing from them, and complained only of the mechanical inconvenience of the prolapse. We incline, therefore, to the opinion, that Dr. West's admission neutralizes the force of the argument derived from the illustration he has brought forward.

4. Whatever value may be attributed to the preceding considerations—which are, in a sense, preliminary—it is quite clear that the question can only be decided by clinical observation. Men may talk learnedly about what ought or ought not to be, but the decision must rest upon *what is*, and to this point Dr. West next addresses himself; previously disposing of an argument drawn from the greater exposure of prostitutes to some, at least, of the supposed causes of ulceration of the cervix uteri. Of 40 cases examined by him, in 27 the os and cervix were healthy; in 10 of the remaining 13 the ulceration was a mere excoriation, not above a line in breadth; in 3 cases, the abrasion was more extensive; but in no instance was there any induration. Taking, now, two classes of cases—those in which ulceration was not present, and those in which it existed—Dr. West proposes to inquire—

"Whether sterility is more frequent, whether the rate of fecundity is lower, and whether abortion occurs oftener in the one class of cases than in the other? Whether menstrual disorder is more common, more severe, or different in kind; whether leucorrhœa is more abundant, or furnished from a different source; or whether pain is less tolerable when the os uteri is ulcerated than when that condition is absent? And lastly, whether similar or different causes produce the uterine affections in the two classes of cases; whether the duration of the illness is the same; whether the structural alterations of the womb are alike or diverse?"

The data upon which Dr. West founds his conclusions consist of 1226 cases; 300 being in-patients of the Middlesex or St. Bartholomew's Hospitals, and 926 out-patients. In 268 of the 1226 cases, the speculum was used; and of these, 125, or nearly one-half, had ulceration of the cervix uteri; while in the remaining 143, this condition was absent. From these facts Dr. West has constructed a series of tables to work out the problems proposed; they are executed with great care, and will repay a careful study. Our space, however, will not permit our referring more minutely to them; but we shall content ourselves with giving the conclusions at which Dr. West has arrived on these various points:

"1. Uterine pain, menstrual disorder, and leucorrhœal discharges—the symptoms ordinarily attributed to ulceration of the os uteri—are met with, independently of that condition, almost as often as in connexion with it. 2. These symptoms are observed in both classes of cases, with a vastly preponderating frequency at the time of the greatest vigour of the sexual functions, and no cause has so great a share in their production as the different incidents connected with the active exercise of the reproductive powers. But it does not appear that ulceration of the os uteri exerts any special influence either in causing sterility or inducing abortion. 3. While the symptoms are identical in character in the two classes of cases, they seem to present a slightly increased degree of intensity in those instances in which ulceration of the os uteri existed. 4. As far as could be ascertained by careful

examination, four-fifths of the cases of either class presented appreciable changes in the condition of the uterus—such as misplacement, enlargement and hardening of its tissue; while, frequently, several of these conditions co-existed. An indurated or hypertrophied state of the cervix uteri was, however, more frequent in connexion with ulceration of the os uteri, than independently of that condition. 5. The inference, however, to which the last-mentioned fact would seem to lead, as to the existence of some necessary relation—such as that of cause and effect—between ulceration of the os uteri and induration of its cervix, is, in a great measure, negatived by two circumstances—(1.) The number of instances in which an indurated cervix co-existed with a healthy os uteri; and (2.) The fact that, while induration of the cervix was present in 25 out of 46 cases in which ulceration of the os was very slight, it was altogether absent in 9 out of 16 cases in which the ulceration was noted as having been very extensive. These inferences sufficiently show that I do not subscribe to either the first or second of those three conclusions, one or other of which, it was stated at an early period of this lecture, would be found to represent the truth of the matter; that I do not regard ulceration of the os uteri either as the general cause of the symptoms which have been attributed to it, or even as a general concomitant of them, and index of their degree and severity." (p. 58.)

Having arrived at this conclusion, Dr. West proceeds, in his third lecture, to inquire into the various causes, constitutional or sympathetic, of uterine ailments: a subject which would bear a fuller and more elaborate investigation than it has yet received, and which we hope may form the material of some future lectures from the same hand, but into which we do not propose at present to enter—our object having been limited to the inquiry into the pathological importance of ulceration of the os uteri.

We have given a brief, though, we trust, a fair and complete account of Dr. West's views, and, as far as possible, in his own words: we have given him credit for the moderate and philosophical tone of his communications, and for the freedom from personal allusion which characterizes his book. But while agreeing with many of his deductions. and doing full justice to the care he has bestowed upon the investigation, we hesitate to adopt fully his conclusions, because we think that there are some considerations of importance which ought to modify them.

To some of these considerations we have already alluded, but we shall take the liberty of recapitulating them, and of adding some others, in the same spirit of frankness which has actuated Dr. West, being fully assured that truth, not victory, is his object not less than our own. Let us premise, however, that we have always objected, and do still strongly object, to the employment of the term "ulceration" to express abrasion or erosion of the os uteri. The two terms are not anatomically synonymous, they signify very different morbid states, they involve very different courses, they imply distinct and opposite consequences, they require different treatment, and their indiscriminate use tends to confuse the professional student as much as it alarms the patient.

1. Looking closely at the matter, we find that the course of Dr. West's researches is framed especially to meet an assertion of certain writers, that abrasion of the os uteri is extremely frequent, that it gives rise to a formidable train of symptoms, and to certain organic changes; and in meeting this assertion he has so limited his ground, that his inquiry is rather into the pathological importance of this opinion, than that of abrasion of the os uteri in any exact and extended sense. In like manner

he seems to follow the assumption that abrasion of the os uteri is a primary and isolated disorder, as though it were established.

2. Taking this view, however, there are some considerations which materially qualify the value of the conclusions to be drawn from each branch of the inquiry, and the force of some of which Dr. West candidly admits. For example, it is clear that any inference from the anatomy and physiology of the cervix uteri in health, must be admitted with great caution as interpreting its liability in disease. The utmost argument we can derive from it is one of probability, and this can only be useful to meet an opposite conclusion based on similar grounds. We agree with Dr. West, that in health the cervix uteri is neither very sensitive nor very vascular, but this proves nothing as to its condition when diseased, for we know that then it may become hyper-sensitive, and give rise to profuse hæmorrhage. The same may be said of other parts of the body, for example, the joints, serous membranes, &c.; pathology reveals conditions which could never have been anticipated from their anatomical and physiological characters in health.

3. The results of a series of general post-mortem examinations may be fairly admitted as one portion of the evidence as to the comparative frequency of uterine complaints. The value of Dr. West's carefully recorded cases amounts to this, that the uterus was found diseased in nearly one-half of a given number of cases, in which no evidence had been given of such disease during life, and in which it had no share in causing death. The proportion is much greater than we should have anticipated, and we much doubt whether the same proportion would hold true of any other organ of the body. But still this is only a part of the numerical evidence we require to form an accurate judgment of the frequency of uterine disease: we require also the proportion of uterine diseases in a given number of cases, and a very large one, for which the patient had sought assistance during life. Surely, it would scarcely be fair to base our calculations as to the frequency of pericarditis, pneumonia, or even chronic diseases, upon the traces of such maladies found after death in the bodies of those who had died from other causes. Further, such observations can never satisfactorily establish the relative frequency of disease of the uterus as regards each other; this can only be done by a careful record of cases of the various forms noted during life, combined with the information afforded by post-mortem examinations. Dr. West has an ample field of observation, and we trust that in a future edition he will complete his numerical calculations in the way we have here ventured to suggest.

4. As we have already stated, we think that the analogy between abrasion of the os uteri *in situ*, and that which occurs in prolapsus uteri, proves too much, for it would equally establish the insignificance of hypertrophy and deep ulceration. Dr. West's very candid observations, which we have quoted, state the incompleteness of this argument very clearly.

5. We quite agree with Dr. West, that, after all, clinical observation is the only tenable ground in this inquiry, and we are not disposed to dispute either the facts or conclusions embodied in, or deducible from, his tables, but merely their extension beyond the ground fairly covered by them.

That abrasion of the cervix uteri has been hastily assumed to be much more frequent than it really is; to give rise to a train of symptoms which may exist in its absence; and to consequences, as, for instance, sterility, disorders of menstruation, abortion, &c., which may accompany or follow it, but which may as frequently arise from other causes, may be quite true, and is deducible from the tables Dr. West has given; but we are not prepared to extend this conclusion so far as to decide that abrasion may not also give rise to these consequences, and that it is of "slight pathological value and rarely calling for special treatment." We shall very briefly state two reasons for our hesitation, without occupying the time of our readers with entering fully into the question.

6. However valuable, and we fully admit its value, the clinical record Dr. West has given us, there is yet a supplement of great importance which ought not to be excluded—viz., the carefully noted experience of those who are much occupied with the special diseases of women. No doubt special practice may lead to exaggeration, especially as regards numerical proportion, but with due care it also affords results attainable in no other way. Now we think that we express the experience of all men thus occupied, when we say that many cases do come before us, in which the utmost vigilance can detect no change beyond congestion and abrasion of the cervix uteri; that in these cases certain trains of symptoms do present themselves; a certain form of broken health does result, and a certain local treatment cures the local affection, and restores the health as a consequence. If these cases be sufficiently defined and sufficiently numerous, they must be admitted into our calculations, nor can they be disposed of by pointing to similar symptoms and consequences when abrasion does not exist. Instead of concluding, that, on this account, abrasion is of no consequence, it would be more scientific to admit the fact, that certain results may be common to different morbid conditions, and to leave it to careful examination to decide upon which they depend in each case. It will be admitted, therefore, we think, that the clinical record, to be complete, must include more than the data given by Dr. West.

7. We cannot but think, however, that an error, the fruitful parent of many others, lies at the bottom of much that has been written about ulceration or abrasion of the os uteri, and that in arguing on the opposite side, Dr. West has not altogether escaped its influence. Either expressly, or by implication, abrasion is treated as an isolated and a primary affection, but if our observation may be trusted, we should say that it is not necessarily either the one or the other. We have most generally found it in connexion with more or less congestion of the cervix or body of the uterus, which fully as often preceded the abrasion, by a distinct interval, as succeeded it: and we have noted that the severity of the symptoms had more relation to the amount of congestion than to the extent of abrasion. Again, we have known hypertrophy and induration to exist for some time before any erosion took place: so that the abrasion seemed to mark a certain stage in the progress of the disease. On the other hand, doubtless, cases do present themselves in which erosion is present, with but little congestion and no induration; and in these, after a time, congestion may, and probably will occur, whether from the

presence of the abrasion, or from a cause common to both, it may be difficult to decide.

We should be inclined to say, that erosion, primary and alone, is comparatively rare, that it is most frequently in conjunction with congestion, and that the symptoms common to this combination vary in intensity according to the amount of congestion and the extent of the abrasion, but more perhaps the former than the latter. Further, as abrasion may be secondary to congestion, the symptoms to which the latter gives rise will naturally be found in such cases without erosion, or before it exists, but will probably be increased after the complication. In order, therefore, to understand and treat each case, and still more to comprehend the entire subject, it is necessary to bear in mind that abrasion may be primary or secondary, and that whilst it may, at least for a time, exist alone, it is much more frequently found in combination with congestion or inflammation of the cervix.

We have ventured to offer these suggestions, not exactly in opposition to the view taken by Dr. West, but as slightly modifying it, and for the purpose of offering a moderate check to the disposition, which seems a part of human nature, to meet one extreme by another. Dr. West's book, we believe, will have a most beneficial effect in leading men to examine more carefully into the subject, and will, we trust, put an end to all unnecessary examinations, and the too frequent use, or rather abuse, of the speculum and certain heroic methods of treatment.

Fleetwood Churchill.

Review IV.

1. *A Manual of Pathological Anatomy.* By Carl Rokitansky, M.D. ('Sydenham Society's Translation.')
2. *An Anatomical Description of the Diseases of the Organs of Circulation and Respiration.* By C. E. Hasse, M.D. ('Sydenham Society's Translation.')
3. *Précis d'Anatomie Pathologique.* Par G. Andral, M.D.
4. *Pathological Anatomy.* By Robert Carswell, M.D.
5. *On Cancerous and Cancroid Growths.* By J. H. Bennett, M.D.
6. *On White Patches on the Pericardium.* By James Paget, F.R.S. ('Med. Chir. Trans.' vol. xxiii.)
7. *On the Nervous Centres, &c.* By Robert B. Todd, M.D., F.R.S. ('Cyclopædia of Anatomy and Physiology.')
8. *On Cirrhosis of the Lungs.* By D. J. Corrigan, M.D. ('Dublin Journal,' vol. xiii.)

(Concluded from No. 27, p. 62.)

The fibroid changes which occur in the *uterus* are of special interest with regard to the subject we are now considering. They comprise the well-known fibrous tumours and partial hypertrophies of its structure. Dr. Prieger, of Kreuznach, describes the latter as separate hard knot-like portions, recognizable by the touch in the surrounding softer parts,

and often associated with a degree of general enlargement. He says they were in most cases the product of chronic inflammation, though the causes of these inflammations could not always be ascertained: often, however, they appeared to have resulted from some injury inflicted during labour. We shall not attempt to enter into any detailed account of fibrous tumours, but only remark that no one, we suppose, will contend that they are produced by inflammation of even the lowest degree. One instance of partial hypertrophy of the cervix uteri which we examined after it had been excised, consisted of a fibroid tissue quite similar to that of the uterus. Now, it is certainly a striking circumstance that the uterus is far the most frequent *habitat* of fibrous tumours, and that the structure of the normal organ and of the superadded growth is almost identical. What the microscope shows in both, is a vast number of round or elongated nuclei, lying in a solid blastema or basis substance, which shows more or less tendency to develop into fibre. It is worthy of notice that the fibres which form in some fibrous tumours are more like those of organic muscle (such as are found in the developed uterus) than those of white fibrous tissue. Dr. Bristowe has shown, in a very interesting communication to the Pathological Society, vol. iv. p. 218, that fibrous tumours developed in the walls of the uterus, if examined at the end of utero-gestation, consist of "muscular fibres, identical in shape, size, general appearance, and arrangement, with those of the uterine parietes." Vogel states that "when fibrous tumours arise in parts where areolar tissue prevails, they consist principally of more or less fully developed fibres of areolar tissue; whilst tumours consisting of simple muscular fibre are only found in those parts which consist in the normal condition of simple muscular fibre." This circumstance is an example of what Vogel denominates "the law of analogous formation," which implies the influence exerted by the tissue in which an exudation takes place, in causing the exuded plasma to develop itself into tissue of a like kind. This influence in the lower animals is very energetic, so that whole parts can be reproduced; in the higher it is comparatively feeble. In the latter it rarely avails to the formation of the higher structural elements; fibrous tissue and bone are easily produced, but muscle, gland tissue, and brain almost never. We entirely agree with the following passage from Vogel, which sets forth a truth to which we may again have to refer. "The cytoblastema on the one hand, and the pre-existing tissue on the other, are each factors influencing the formation of organized morbid products, and it is on their different properties that these epigeneses are dependent, both for their mode of formation, and for their general characters."

We have had, through the kindness of Mr. Curling, the opportunity of examining a portion of a *testis*, which had been removed on account of hæmatocele. There was manifest evidence of inflammatory effusion in the tunica vaginalis, and in the surrounding integument. The cut surface of the testis was of a whitish colour, and imperfectly lobulated aspect: and on minute inspection, opaque whitish streaks were visible to the naked eye, coursing through a more translucent greyish mass. The size of the organ was not apparently much increased. The white streaks were convoluted tubes filled with a very fatty epithelium; they were imbedded in induration matter, consisting of fibroid substance containing extremely

numerous nuclei or small cell particles. In this case it is clear that inflammatory action in the vicinity had been the cause of the intertubular exudation in the substance of the testis. This exudation, however, was so far organized, had increased to such an extent, pushing the tubes widely apart from each other, and appeared on the whole so decidedly in a condition of growth, while at the same time there was no appearance of hyperæmia in or about it, that we cannot look upon it as simply and merely an inflammatory result. There seems to us sufficient evidence that there was more at work than mere inflammatory action, that the exudation was in a condition of growth and development, acting indeed much in the same way as the blastema of a new growth. Had it been left to itself, it might afterwards have retrograded, but it was clear to our examination that it was in a very different state from the exudation of simple inflammation, which usually tends to degeneration and absorption, or to change into cicatrix tissue.

We merely refer to the case of the *enlarged prostate*, lest any of our readers should think we were passing over a highly illustrative instance of fibroid change without notice. We were of opinion, till recently, that this enlargement depended simply on an increased formation of fibrous tissue; but by the kindness of Mr. Simon and Dr. Bristowe, we have had the opportunity of examining two specimens, which exhibited on the whole as much new glandular tissue as fibrous. Follicles with an epithelial lining, and concretions such as exist in the normal gland, were found in the most peripheral parts of the enlarged mass. In one of the specimens the third lobe was considerably enlarged, but it presented nothing different to the other parts. This glandular hypertrophy is certainly very remarkable, and has no exact parallel among organs of the same kind. The amount of fibroid tissue varied in different parts, in proportion to the glandular; its development was probably secondary to that of the gland tissue. Further observation must show whether the enlargement of the prostate is ever, as it has been regarded, due merely to fibroid hypertrophic formation.

The following account of fibroid degeneration in *muscles* is given by Rokitansky:—

"Induration is a mode in which inflammation frequently terminates; it is often found to have occurred at some isolated spots, especially in the heart. The exudation in the inflamed part coagulates, and becomes converted into a whitish, lardaceous, firm callus, which assumes a fibroid structure, but is still traversed by a few pale and broken muscular fibres. The appearance of the callus varies according to the original quantity of exudation; at first it forms cords and streaks which ramify among the fibres and fasciculi of the muscle, or more extensively round, or nearly round masses, which may be tolerably circumscribed, or may branch out irregularly in various directions. In the course of time it may diminish in size considerably, partly from absorption, partly from its shrinking and becoming more dense, and from the disappearance of the muscular substance that still remains within it. As it thus diminishes in size, it draws in the surrounding tissue, and assumes the appearance of a deep cicatrix. In a few cases this mode of termination has been found throughout the whole of a large muscle, and even in all the muscles of one or more of the limbs, particularly of the lower extremities; they were changed into a white tendinous structure, and here and there into bone."

The foregoing account may be taken as a typical description of the progress of ordinary inflammatory exudation, ending in cicatrix tissue, in almost any part of the body. Only, we must remark, that in the cases mentioned in the last sentence, there must have been some peculiarity in the exudative process differentiating it from ordinary inflammation, and probably connected with some peculiar crasis of the blood. Andral notices as follows the development of fibrous tissue in a muscle under different circumstances.

"There are other cases in which there is nothing at all to demonstrate that any process of irritation whatever has preceded the fibrous transformation. In this there is nothing surprising; have we not in fact recognised that in every alteration one cannot conceive irritation to play any other part than that of tending to turn aside the nutritive act from its normal type; but that, independently of this, this derangement may very easily take place; reason indicates this, and observation proves it. I have seen once, for example, the sterno-cleido-mastoid muscle of the right side transformed in its whole extent into a perfect fibrous tissue, exactly similar to the broad tendon which terminates it below. Was it irritation which had presided over this transformation ?– quite the reverse. The patient in question having suffered for a great number of years from hemiplegia, with permanent contraction of the left sterno-mastoid, the corresponding muscle of the other side had been condemned for a long time to absolute inaction; this muscle had become a fibrous organ, as in animals one sees certain parts become fibrous from having been fleshy, by reason of the single circumstance that a modification of function has rendered muscular contraction useless. Several facts lead me also to admit that in certain cases of atrophy of organs, fibrous tissue tends to develop itself where the proper parenchyma of the part tends to disappear."

It can scarcely be questioned that there was actual formation of new fibrous tissue in this instance, as occurs in analogous instances of equinovavus; and from this it certainly follows that other causes besides hyperæmia may originate this change. Mr. Hancock's statement, that the columns of the dilated and hypertrophied bladder are not muscular, but composed for the most part of elastic cellular tissue, is also to the same effect.

We resort again to Andral's storehouse for instances of change of the kind we are considering in the *nervous centres*. In his 'Anat. Path.' vol. i. p. 284, he speaks of cartilaginous transformation taking place in various parts. By this term we may safely account that he means fibroid development to a degree that closely resembles cartilage in outward appearance. Having questioned the production of cartilage in other localities, he proceeds:—

"If, however, there is a parenchyma in which my own researches lead me to admit the occurrence of cartilaginous transformation as a really observed fact, it is the brain; once, in fact, in a girl about twenty months old, I found several convolutions of the upper face of the two cerebral hemispheres, remarkable by their extreme hardness. Pressed strongly between the fingers they resisted like cartilage, of which they had the homogeneous texture, the ivory white colour, and the elasticity. Other similar indurations existed in the thickness of the hemispheres, and at their base."

The only symptom observed in this girl while in the hospital, was a continual rotatory movement of the head. In the chapter on Induration of the Nervous Centres, he assigns three degrees of this change, in the most extreme of which the nervous substance is as consistent and elastic

as fibro-cartilage. There can be no reasonable doubt that induration in this locality is essentially similar to induration in others, and that it depends on processes of a like kind. One of the most frequently operating of these is, no doubt, hyperæmia, giving rise to exudation, which solidifies and passes into the condition of more or less perfect fibroid tissue. It is, however, a question whether exudations issuing in the formation of similar products may not take place independent of anything that we can recognise as inflammation, or even perceptible hyperæmia. With regard to this, we shall first allow Andral to speak for himself.

"The causes under the influence of which the nervous centres augment in consistence to the different degrees which we have noticed are still obscure. Still, if one reflects that general induration in the first degree, either of the brain or of the cord, is most frequently accompanied during life with all the symptoms which characterize an irritation of the nervous centres: and that, besides, after death, one often finds traces of irritation of the membranes, and in short, a more or less vivid injection of the nervous substance itself, one is led to think that this induration is also a result of the irritation of this substance, or, if you will have it so, of a degree of encephalitis. As to partial induration, it may be like general induration, a result of irritation. The existence of this induration around old apoplectic foci, on several morbid productions, the state of the meninges, which have been found thickened and infiltrated near the indurated parts, and might be given as proofs of it. As to the rest, in the greater number of cases of partial induration observed hitherto, it is only as an hypothesis that we can admit as their cause an antecedent irritation. Here, then, we shall confine ourselves until more amply informed, to refer partial induration of the brain to a perversion of the nutritive act; all the while recognising that irritation may be one of the elements of its production, as it may concur in the development of all the possible alterations of nutrition or secretion."

We think there is great wisdom in the last paragraph; it is the view of a large minded observer, who can see that Nature does not confine herself always to one exact mode of arriving at the same end.

It seems worth while to examine the cases which Andral has recorded of cerebral hypertrophy, for, though the idea may seem novel, we cannot but believe that this change must really consist in an exudation taking place throughout the nervous tissue, and not in a true increase and growth of the tissue itself. We regret that we have no microscopic evidence as yet to establish this view; but the weight of probability seems to us immensely in its favour, as well as the bearing of what is known concerning it. In the first case there was, during eleven years, intermittent headache, the paroxysms occurring about once in two months, and lasting about twenty-four hours. The headache was regarded as migraine. A year before he came under Andral's care, the pain in the head became constant, with exacerbations: after six months, convulsive attacks supervened, and became latterly more frequent; after a more severe attack than usual, coma came on, and the patient died. The pulse had been 55, the intelligence intact. There was no disease of the meninges. The cerebral substance was bloodless, of extraordinary density, like boiled white of egg; the convolutions were compressed together, and even the walls of the ventricles approximated. The grey matter of the corpus striatum, and of the thalamus opticus, as well as the cortical, was colourless. In the second case, epilepsy existed for fifteen years, and became more severe up

to the end of life. During the last six years there was severe pain of head, not associated with the epileptic attacks; latterly the intellect failed, and she became imbecile. Death took place in an epileptic fit. The morbid appearances were very similar to those in the preceding case.

In the third case, there existed for ten years intermittent pain of head, with occasional confusion of ideas. During a more severe attack of pain, convulsions came on, followed by loss of consciousness; he recovered partially for a time, but his intelligence failed more and more, muscular debility increased, and before long he sank. The pulse had been 56, the digestion good, the respiration tranquil. The morbid appearances were the same as in the two other cases, and it is remarkable that the cerebellum, pons Varolii, and spinal marrow were not affected. In M. Scoutetter's case, æt. $5\frac{1}{2}$ years, the head increased gradually in size, till it was as large as an adult's. The intelligence was natural, and there was no morbid phenomenon, except the frequent tumbles occasioned by the weight of the head. The child died of acute enteritis. The parietes of the cranium were thicker than usual; the dura mater was firmly adherent to them (as it always is in children). The pia mater was very much injected, and of an opaque white in some points. Except the increase of size, the brain appeared healthy. Now, we do not suppose there can be much doubt that this case differs only from the preceding in the circumstance that the true nervous matter was not compressed by the unyielding cranial walls. It can hardly be thought that a true hypertrophy of the brain existed, otherwise surely there would have been some apparent superiority of intellect. The truth probably was, that there was just the ordinary amount of nervous matter *plus* a certain quantity of interstitial exudation. The thickening of the pia mater, and its injection, show that there had been an abnormally great supply of blood, but it seems scarce just to speak of the case as one of encephalitis, even of the most chronic kind. In the three cases quoted above from Andral, there was absolutely no trace whatever of inflammatory action; indeed, the condition of the membranes is almost conclusive evidence against the possibility that any had ever existed. Of the same kind as the foregoing we feel inclined to consider the case recorded by Dr. Sweetman, and quoted in Dr. Watson's lectures. The head gradually enlarged, as in chronic hydrocephalus, but there was nothing to indicate disease of the brain. Death occurred from pneumonia. The brain appeared healthy; there was a patch of false membrane as big as a crown-piece on the upper and anterior part of the dura mater, and some jelly-like effusion beneath the arachnoid at this part. The medullary matter in different sections displayed very unusual vascularity (probably the result of the pneumonia). Dr. Watson infers from these cases that such enlargement is not an indication of disease, not a cause for treatment. With some hesitation, we must say that we cannot view them in this light. Such increase of size, we must think, is with infinite more probability due to *unreal* than to real hypertrophy, and is an unquestionable evidence of morbid action. May we not fitly compare such enlargement with that of the baconny liver, which may attain (as in a case recently in St. Mary's) a very great size, easily recognisable during life, but not producing any special symptoms, and not appearing manifestly diseased after death, except to the practised eye. In Dr. Sweetman's

case, there was further evidence of hyperæmia, in the patch of false membrane on the dura mater and the subarachnoid effusion, but we still think the symptoms during life, as well as the post-mortem finding (we borrow the German phrase "befund"), can hardly justify the view of inflammation being the essential cause. We cannot but acknowledge the force of Andral's questionings in his remarks on the above cases.

"Anatomy," he says, "shows us but the last term of the disease, and does not reveal to us all the shades, or all the degrees, through which the alteration must pass from the moment when it evinced its existence only by a transient pain of head, to that when serious disturbances attacked simultaneously intelligence, motion, and sensation. What, for example, was the change which came on suddenly in the brain the day when, with equal suddenness, the patient was seized for the first time with an epileptiform attack?. Did hypertrophy of the brain already exist at this period? Was there as yet but mere cerebral congestion? Did this congestion ever exist at any period of the disease? This congestion, which is so convenient to serve as a means of explaining a great many cerebral disturbances, is it as common as we imagine? It is certainly from views altogether hypothetical, that we constantly make it come in to explain either most of the disturbances of organization, or many functional disturbances."

We would offer the suggestion whether there may not be an analogy between these cases of hypertrophy and those of chronic hydrocephalus. The latter is an acknowledged dropsy, as much as in many instances hydrocele is; inflammation, in the ordinary acceptation of the term, is not of its essence. Neither do we think it is in the case of hypertrophy; but that, in consequence of certain obscure conditions of the blood, and of the affected part, the plasma which should simply nourish the nervous structure, deposits interstitially a substance which solidifies, and causes, if the walls are unyielding, injurious pressure on the involved tissue; if they are not, enlargement of the head without symptoms of disease. We fully grant that careful examination is required to substantiate this view, but, on account of the rarity of the cases, an opportunity of doing this may be long delayed, and we have not thought it, therefore, too speculative to notice as we have done the state of so-called hypertrophy of the brain. True hypertrophy, without some special cause to call it forth, is a thing so almost unknown, that we do not think we can err much in interpreting the increase of size and weight in a different manner to that which has hitherto been followed. After having written the above, we referred to Dr. Todd's article on the 'Nervous Centres,'* and were glad to find that he inclines to the same view. "It is most probable," he says, "that the disease consists not merely in an increased, but also in a perverted nutrition, and that new material is deposited between or in the proper anatomical elements of the brain." This conclusion is, moreover, we think, really supported by Rokitansky's statement, who, though he asserts the disease to be a genuine hypertrophy, immediately adds, that it consists not in an increase of the number of nerve tubules, nor in an enlargement of the old ones, but "in an excessive accumulation of the intervening and connecting nucleated substance." Now as we have never seen in healthy brains this nucleated substance, and no mention of it is made by the best observers, we think we may safely conclude that it must be a new deposit. Rokitansky does not think that congestion affords any satisfactory explanation of cerebral

* Abnormal Anatomy: Cyclopædia of Anatomy and Physiology.

hypertrophy, he connects it with "the excessive development of the lymphatic system."

In some cases, at least, of *atrophy of the brain*, it is probable that the essential cause is of a similar kind. The exudation seems, however, to pass more decidedly into the form of fibroid tissue, and consequently causes shrinking instead of enlargement, and greatly increases the firmness and toughness of the affected part. Dr. Todd speaks of having observed atrophy of the brain in epileptic cases of long standing, and in persons habitually intemperate. He describes the condition as follows:—

"The brain has a shrunk appearance. Its texture feels firm, and on cutting, the knife grates against it as in cutting cartilage. In point of colour, the grey matter is frequently extremely pale, and scarcely to be distinguished from the adjacent white substance: in some instances, however, it is of a dark brownish hue. In all cases the layer of grey matter which covers the convolution is less deep than natural. The convolutions are evidently shrunk, and the sulci between them have greatly increased in width. The white substance of the brain has increased in density, and in the transverse section several vessels are cut across, the section of which occasions numerous bloody points on the surface of the centrum ovale. The corpora striata, optic thalami, pons, and medulla oblongata, are all obviously shrunk, and firm in consistence. As a constant accompaniment of the wasted brain, we find a more or less opaque condition of the arachnoid membrane, with considerably enlarged Pacchionian bodies."

Dr. Corrigan* has shown that, in some cases, an alteration takes place in the *pulmonary tissue* very analogous to that which constitutes the essence of cirrhosis of the liver. After reviewing the changes which take place in the latter condition, he goes on to say that the disease is in the lung when it is in the liver; that it is occasioned by the contraction of the interstitial fibrous tissue and the general fibrous envelope of the lung, aided by the natural contraction of the elastic fibres which run longitudinally along the bronchial tubes, and tend constantly to shorten them, and draw all portions of the lung from its circumference towards its root.

"Of this peculiar diseased action in the matrix of the lung, consisting of a gradual but certain contraction of the fibres of the cellular tissue, pathology furnishes us with many instances, but why fibro- or fibro-cellular tissue should take on this contractile action is, as yet, a mystery. It is probable that, in a great number of such instances, the commencement is a slow inflammatory action, causing some deposition of lymph in the tissue affected. This lymph then takes on the nature and properties of the tissue which has secreted it; the diseased action, however, does not stop at this point, but the tissue affected taking on a contractile action, changes, and symptoms are then produced depending on the functions, situation, &c. of the organ attacked."

The following case, which he quotes from Laennec, gives a good idea of the changes produced by the process in an extreme degree. A man had suffered twenty years from cough and muco-purulent expectoration; he died suddenly, with symptoms of apoplexy. The right lung was sound, and very large. The left lung was not larger than the size of two fists—it was adherent nearly throughout to the pleura costalis. The whole tissue of this lung was transformed into a substance of fibro-cartilaginous appearance; the smaller bronchi and air-vesicles were obliterated; the larger tubes were nearly all dilated. In this case, there is no mention of

* Dublin Journal, vol. xiii., 1838.

an acute attack which may be supposed to have given rise to the exudation of lymph interstitially; the process seems to have been chronic throughout. In the first case, there was only slight pleuritis; and the commencement of the cirrhotic change does not appear to be at all definitely marked. In the second case, also, the disease seems to have commenced gradually. In a case recorded by Dr. Stokes, a woman, æt. 40, had for several months cough and disturbance of the breathing, which could not be accounted for satisfactorily; the left lung was much diminished in size, very irregular on its surface, contained numerous little hard, but not tubercular, bodies; the larger bronchi were dilated, the smaller obliterated, the pulmonary tissue indurated. In a case mentioned at the same time by Dr. Green, it is stated that a woman had for many years a very obstinate cough; after some time, emaciation took place, with night-sweats; hæmoptysis occurred several times, with copious expectoration. The right pleura was much thickened; the lung shrunken and indurated; the diaphragm adhered to the liver. In an interesting case recorded by Dr. Law,* the left lung was found reduced to a mere rudimentary state, and formed a small mass of tough fibro-cellular structure, displaying, when cut into, the mouths of the dilated bronchial tubes, but no trace remained of its vesicular structure. The heart was found situated immediately under the left clavicle; the diaphragm was drawn upwards a considerable distance, so that the stomach reached above the fourth intercostal space. The margin of the right lung projected into the left side of the chest; and on examining this lung, it was found in a highly congested state, with a few tubercles scattered through it. The left lung presented no trace of tubercular disease. The patient was a girl, æt. 16; she had several attacks of bronchitis and pneumonia, affecting the *right* lung during the latter three years of her life, as well as hæmoptysis, but the cirrhotic condition seems to have been formed prior to this period. It does not seem that, in any of the foregoing cases, the cirrhotic process was the result of ordinary pneumonia. This disease certainly does not in most cases produce any contraction of the lung; but Drs. Corrigan, Stokes, and Walshe agree, in opposition to MM. Grisolle and Woillez, that in some cases it does do so. Dr. Walshe says—

"Why should not the same contraction (occurring as a law of its existence) of exudation, poured out into the substance of the lung, cause similar alteration in the form of the thorax? It appears curious that M. Grisolle, who professes to have seen the size of the lung, enlarged by interstitial exudation solely, gradually return to its natural state, should maintain depression of the surface to be impossible. What is to prevent the tendency to diminution of bulk from gradually bringing the lung to a less volume than in health?—and this once effected, will not depression of the parietes inevitably follow?"

The common hepatizing exudation of pneumonia has appeared to us to consist chiefly of a large quantity of granulous and oily matter, imbedding very numerous celloid particles, or granulous globules, and, at a later period, numerous glomeruli. This is an exudation which manifestly tends to liquefy and to be reabsorbed, not to remain, and to pass into the state of solidification, with fibroid development. Dr. Walshe, recognising the rarity of chronic pneumonia, except as an indurating process taking place

* Dublin Journal, vol. vi., 1848.

around tubercle, cancer, &c., speaks of it as that form of disease in which an impermeable tissue is infiltrated with toughly-solid exudation, and where there is no tendency to a softening process. Rokitansky says, that when the red inflammatory product becomes of a greyish-red tint, and finally grey, and also compact and indurated, it constitutes *indurated hepatization*, which has sometimes been regarded, but incorrectly, as chronic pneumonia. Both Rokitansky and Walshe recognise a certain amount of shrinking of the lung as the result of such chronic pneumonia, but it never seems to arrive at anything like the degree which is seen in cirrhosis. Hasse, embodying in his description Andral's researches, has given a very good and full account of chronic pneumonia, which accords with our own observation, so far as it extends. He recognises two forms —a grey and red induration; and inclines to Hope's opinion, that the difference of colour is only the result of accidental circumstances, and does not indicate gradations of change:

"We meet most frequently," he says, "with the grey induration, or, as it is sometimes called, white hepatization. It is mostly associated with the development of tubercle; and, in the few marked instances which came in my way, I was unable to draw the precise limit between pneumonic induration and grey tubercular infiltration. The former was distinctly cognisable in the lower half of the lung, the latter in the upper half; at the apex were several small cavities, precisely resembling those of tubercular phthisis. There were at the same time traces of the tubercular constitution in other organs. The transitions and combinations of the two diseases are probably numerous, whilst chronic pneumonia is sufficiently rare to render the discrimination in a given case a difficult task. At the part affected, the lung is distended, preternaturally heavy, and completely impermeable to air; even the bronchial twigs are mostly choked up with a similar matter. Of the natural texture, nothing is distinctly traceable: the surface on incision looks grey, here and there inclining to yellow, diversified with separate white stripes and arborescent patches of black pigment. The whole mass is hard, incompressible, neither friable nor easily penetrable by the finger, but yet fragile and readily torn. It is mostly the inferior lobe of one or both lungs that is thus affected; and as the chronic inflammation proceeds from below upwards, it meets the tubercular process advancing in the opposite direction."

Hasse thinks that the chronic pneumonia, in cases where the two are coexisting, is the cause of the tubercular deposit: to us it has rather appeared that the exudation which takes place has itself more or less of tubercular nature. In a case which we have already mentioned, numerous absorbent glands were greatly enlarged by the deposition of firm, fibrinous blastema, while in the lungs there were numerous sub-pleural fibrinous nodules, and infiltration of the upper parts with grey tubercle-like matter, excavated by one or two small cavities at the apices. The other form, red or brown induration, "is far more rare, and apparently not necessarily connected with tubercular or other cachexia." It seems to be the consequence in several cases of extensive hypertrophy of the heart, the impulse of the ventricles aggravating the habitual congestion of the pulmonary vessels until a chronic inflammation was set up. "The diseased lobes (the lower) were but moderately distended; their colour was of a dark brownish-red; both their absolute and their specific gravity augmented; and their consistency greater than usual." Their parenchyma appeared consolidated, but not saturated with blood or serum; their cut surface was smooth and even.

"Andral and Hope describe chronic pneumonia as a slowly-developed hypertrophy of the septa of the lobules and cells, attended during the period of augmented vascular activity with a very gradual deposition of albuminous matter into the interstices of the pulmonary substance. In some instances, the cellular septa of the pulmonary vesicles are said to increase in consistency, so as to acquire a semi-cartilaginous character."

We think with Rokitansky that it is better to distinguish true chronic pneumonia, in which the air-cells are not compressed, but are filled up by exudation, from the cirrhotic process, which the German pathologist names *interstitial pneumonia*. Rokitansky says:

"The seat of this inflammation is the interstitial cellular tissue of the lungs, although the walls of the air-cells are often also implicated, in which case the pneumonia sometimes assumes the croupous form. Its course is, as a general rule, chronic; and it is only very rarely that we have the opportunity of studying it, except in its final effects. So far as we can conclude from our few observations, it appears to commence in the tissue lying in the interstices of the pulmonary lobules, and between the smaller groups of air-cells, which, if too much black lung-substance be not present, becomes of a pale-red colour, and is swollen by albuminous infiltration, while the air-cells are either pale, or more or less compressed in proportion to the swelling; or, if they are involved in the inflammation, they appear reddened, and, in accordance with what has been already stated, sometimes finely granular. In the progress of time, the infiltration within the interstitial tissue becomes organized, and coalesces with the latter so as to form a dense cellulo-fibrous substance, which compresses and obliterates the air-cells, and finally converts them into a similar cellular tissue. We then find either whitish-hard stripes, which not unfrequently grate under the knife, or irregular masses interwoven in the lung-substance. This is the ordinary metamorphosis consequent on chronic pneumonia; in some cases, however, it may terminate in suppuration, which isolates the individual lobules; and some pulmonary abscesses probably originate in this manner. It is not very unfrequently a spontaneous affection, insidiously spreading from one lobule to another; it is commonly seated in the apices of the upper lobes; and, as we may infer from the coexisting cellular adhesions, corresponding to their seat and distribution, it is frequently combined with circumscribed pleurisy. The affected portions of lung become depressed, and draw down the surrounding parenchyma in the form of cicatrix-like folds, which may sometimes be observed on the apices of the lungs in cases where there is no trace of the pre-existence of tubercle. A further consequence of this process is a depression of the thorax at the corresponding spot, and internally, a dilatation of the bronchial tubes."

From all the above details, it seems pretty clear that we may distinguish the following typical conditions:—1. Ordinary hepatizing pneumonia, with granulous and cell-forming exudation filling the air-vesicles: in some cases, even this exudation is of a greyish appearance. 2. So-called chronic pneumonia, the air-vesicles filled with an exudation which varies in different instances, through all possible gradations, from solidified fibrinous to tuberculous matter. The colour of this is mostly grey, as if untinged by the colouring matter of the blood. 3. Cirrhosis, which essentially consists in the formation of fibroid substance interstitially throughout the lung, but may be combined with more or less of intra-cell exudation; just as, on the other hand, chronic pneumonia may be with some degree of cirrhosis. From a consideration of the structure of the lung, remembering how the close capillary network lies in a narrow interstice between gaping air-cells on both sides of it, it seems to us very reasonable that any amount of hyperæmic stress should cause effusion to take place into the

air-cavities; and that it is only a very gradual and slow exudation, almost consumed as it takes place in fibroid formation, that can be confined to the interstices solely. Hence pure typical cirrhosis would always be a very slow gradual process, while it is conceivable that chronic pneumonic hepatization might take place much more rapidly. However, we would remark, that the grey colour, which is most usual in the latter state—except, as Hasse observes, when there is an absolute constantly congesting cause in operation (cardiac disease)—seems to indicate that the exudation takes place without much hyperæmia. Exudations in most parts, and certainly in the lungs, which are poured out from inflamed and loaded vessels, generally, if not always, contain dissolved hæmatin. Those, on the other hand, which take place slowly—as tubercle, and baconny matter—are usually pale. A partial amount of cirrhosis, as noticed by Rokitansky, is often seen, especially at the apices of the lungs, and is certainly often quite independent of tubercle, and, *à fortiori*, of caverns. Dr. Walshe has some very good observations in his article on Adventitious Bodies, in the 'Cyclopædia of Anatomy and Physiology,' correcting the false conclusion of Laennec, that such thickenings and puckerings indicate cicatrized vomicæ. The small sub-pleural nodules, as also deeper-seated ones, which are often met with, are manifestly the result of small separate exudations, of a fibrinous material, which contracts, after a time, into this form. They are the pulmonary granulations of Bayle. Laennec regarded them as a first degree in the development of tubercle; and, indeed, their form gives us a tolerably good hint as to the cause of the characteristic form of tuberculous deposit. Broussais imagined they were lymphatic glands engorged! Andral considers them as resulting merely from the existence of a great number of partial vesicular inflammations. We see so little evidence of any previous inflammation, that we look on them as simply exudations, and cannot find any more reason for considering them to originate in inflammation than we can for tubercle.

We have had two opportunities of observing a change in the *placenta*, which appears to us to belong very truly to the class we are now considering. The material portion in each was converted into a rather thin, leathery, firm, dense layer, while the fœtal portion was more or less completely atrophied. The whole of the organ in these instances was affected, but a similar local change seems to have taken place in the cases recorded by Dr. Barnes, in his paper on 'Fatty Degeneration of the Placenta.' Whether general or local, we believe the morbid process to consist essentially in the exudation of fibrine in the substance of the placenta, which in the one case forms hard masses, subsequently undergoing fatty transformation, and in the other induces a general wasting and atrophy of the whole material structure, preventing the access of blood, and abolishing the function of the organ. In one of our cases, the movements of the child were felt for about a fortnight; at the end of this time, about the fifth month, they ceased, and signs of the death of the fœtus were observed; abortion took place about the middle of the ninth month. The mother was a pallid, weakly person, who had borne living and healthy children before, but in consequence of a fever occurring in her family, and anxiety connected therewith, had become debilitated, and had miscarried two or three times.

When we presented the specimen to the Pathological Society, the following most interesting case was mentioned to us by Mr. W. Adams, whose sagacity in the management of it, and kindness, in communicating its details to us, we highly appreciate:—A lady, tall, stout, muscular, of very healthy appearance, and of a healthy, long-lived family, rather disposed to get fat, and having a slow pulse of about 60, hardly disposed to vary even under excitement, miscarried three times at the seventh month. The placenta each time presented very similar appearances to those which are mentioned above, but much less advanced; the fœtuses were well-developed. On the occasion of the third pregnancy, a mild mercurial treatment was adopted, on the view that miscarriage had been produced the two first times by inflammation of the placenta; absolute rest on the sofa for two months was also enjoined. This plan had no good effect; the patient complained of great weakness, sense of fatigue, and debility, with much bearing-down pain. Miscarriage occurred about the same period, or possibly a little later, and the placenta was in the same state as the former ones. Mr. Adams examined this placenta carefully by the microscope, and observing the non-plastic character of the exudation, which exhibited no tendency to cell-development, he came to the conclusion that there was not sufficient evidence to justify the opinion that the changes were of inflammatory origin; he was disposed to think that congestion alone might lay the foundation of the mischief. To meet this, he proposed in the next pregnancy to employ at first a small bleeding, and afterwards to administer quinine and other nervine tonics. Bleeding was, however, omitted, and quinine given regularly in the form of pills, together with one or two glasses of port wine daily, for a long period. She observed moderate, but not absolute rest. This treatment agreed in every respect, and gestation proceeded to its full time, when she gave birth to a very fine boy, her first living child. The placenta was rather small, and presented only slight thickening and opacity on the uterine surface. In the succeeding pregnancy, very little quinine was given (for she did not feel to want it), but a good allowance of port wine and beer. The result this time was equally favourable; the placenta was of full size, and healthy in every respect. The moral of this most instructive case is obvious; and we recommend it especially to the consideration of those who may not have sufficiently considered the change in the type of disease since an earlier day. Rokitansky regards the process as inflammatory; he says:

"Inflammation of the placenta generally gives rise to a plastic fibrinous deposit, which is reddened by the colouring matter of the blood which it contains, and by which the diseased portion is rendered denser and more lacerable. This may be termed hepatization of the placenta; it may be recognised by the increased resistance, and nodulated tumefaction, presented to the touch. In the course of time the deposit assumes a pale red, greyish or yellowish red, or even yellowish white tinge; at the same time it becomes firmer, and, together with the included obliterated tissue, contracts and shrinks. The inflammation has thus terminated, as it usually does, in induration and obliteration of the placental tissue, which is converted into an ashy, tough, leathery callus, resembling elastic tissue. It appears an established fact that an adhesion may form between the placenta and the uterus, in consequence of a process of this kind."

In a note appended to Dr. Barnes's paper* there is an interesting

* Medico-Chirurgical Transactions, vol. xxxiv. p. 101.

instance recorded, in which a placenta, quite fresh, healthy-looking, of average size, was covered on its fœtal surface, for about half its extent, with a layer of glistening yellowish-white substance, exactly resembling true fat. In parts it was nearly half an inch thick; the basis of it was found to be fibrine, containing innumerable oil drops. The child was living and healthy; the mother had enjoyed good health throughout gestation. It seems almost impossible to suppose that this exudation of fibrine had taken place in consequence of inflammation; the process must surely have been of a much more gradual and tranquil kind, rather a mere exudation. Dr. Ogier Ward has recorded, in the report of the Pathological Society for 1850–51, some cases of diseased placenta, apparently of the same kind as those above quoted. "In the first case the placenta was very small, more than half being unfitted for its functions by deposits of masses of lymph in its substance; and along a part of its edge, on the fœtal surface, it was studded with semi-transparent minute projections, closely resembling the deposits upon the peritoneum in scrofulous inflammation of that membrane." The fœtus was between the sixth and seventh month, and lived only a few hours. "The mother had suffered severely during her pregnancy from vomiting, and the placenta adhered more firmly than usual." Other placentæ, from different cases,

> "Were exhibited in proof of the great frequency of the occurrence of lymph and bony deposits in their substance, and the little influence such changes usually have upon the fœtus, except where they affect a considerable portion of the placenta. But it was remarked that they occurred more frequently in the subjects of lying-in charities than in women in better circumstances, though the cases hitherto observed were too few to warrant a conclusion upon that point."

In these cases, also, the only thing absolutely certain is, that exudation had taken place, but whether from inflammation, or independently of it, is not clear. Only there does not seem to have been any symptom indicative of inflammation which attracted attention.

It does not seem to us a thing at all unlikely, that in an organ so completely constructed upon Ruysch's plan—i.e., made up of vessels, as the placenta, there should take place either exudations of fibrine under circumstances causing congestion, or coagulation of fibrine in some of the large uterine sinuses which invest and imbed the fœtal villi. The organ is one which we should think even more liable to such occurrences than the spleen is to those fibrinous deposits which are so frequent in it. It seems probable, from the cases above-mentioned, that deterioration of health is a promoting cause of these changes in the placenta, and this may operate both by increasing the quantity of fibrine in the blood, and rendering it more prone to coagulate. Zimmermann has shown that debilitating influences increase the proportion of fibrine in the blood, and an increased tendency to coagulate is itself an indication of lowered vitality. For proof of this latter statement, we may refer to a case of spontaneous coagulation of the blood in the veins of both lower limbs occurring in a tuberculous subject, which we mentioned in the review on 'Fatty Degeneration,' as also to various instances of a similar event taking place in the arteries leading to a part, and producing mortification.

In approaching the question as to the nature of the changes which we have reviewed at length, we would express how completely we are aware

that our knowledge respecting them is extremely imperfect, and that any view we adopt can only be considered as hypothetical and provisional. The great difficulty to a correct appreciation of the real causative conditions of these changes is that we have so little knowledge of their existence during their earlier stages. They arise imperceptibly, and proceed silently in their increase, and our attention is scarcely aroused to them until their secondary effects begin to appear. When death has occurred, and the post-mortem examination gives certainty of their existence, the primary conditions cannot be detected among the secondary changes that have taken place. For instance, in a case of cardiac dropsy, when a patient has sunk with engorged lungs, and fluid gushing out into all the serous cavities and cellular texture, how shall we form the remotest idea of the state of the blood which existed while the obstructive disease of the mitral valve was in progress? Often do we sigh for the refined and improved diagnosis, or even for well-directed efforts towards it, that we hope may teach us some day *invadenti occurrere malo.* We do simply weary of descriptions of murmurs and râles, so destitute as they often are of true pathological significance. We do trust the highly educated physician will one day aim more earnestly to anticipate, and more effectually accomplish the arrest of, the now incurable changes which we have described. The power to do this must come from a thorough knowledge of their nature, of their probable causes, and of the usually coexisting bodily conditions. It will require a thorough experience of remedies in their so-called alterative action, a keen appreciation of the constitutional peculiarities of each individual case, and the utmost perseverance and patience. As we are touching on this subject, we cannot forbear adverting to the admirable lessons contained in Mr. Tyrrell's work on diseases of the eye, especially the chapter on scrofulous and malignant disease of the retina or optic nerve. It has always appeared to us an exercise of the highest medical skill to be able to await patiently for some weeks or months the *commencement* of any improvement from the use of a remedy, in the confidence that such gradual procedure is the only means to obtain ultimate success. Such men are the Fabii of our benevolent warfare against disease, and will repeatedly succeed in repelling Hannibal, when less patient and resolved minds would inevitably fail. It was once said to us by an experienced physician, "by diet and regimen you may turn a person inside out," and we believe if we did more thoroughly understand this, and act upon it, we should greatly diminish the number of the *opprobia medicinæ.* Do not (*pudet fateri*) the homœopathist and the hydropathist too often set us examples in this respect?

We have little to observe with respect to the general systemic conditions which give rise to fibroid changes, except the circumstance that they often occur in two or more parts simultaneously. It is no uncommon thing to find traces of the same process in the liver, the capsule of the spleen, the peri- or endo-cardium, the kidneys, and even other parts in the same subject. We have given examples of this in a paper containing some notices of the morbid conditions of the liver, in vol. xxxv. of the 'Medico-Chirurgical Transactions.' In case 69 of the first list, it is stated that the Glissonian sheaths of the liver were much thickened, the capsule also thickened considerably in two or three patches; the kidneys

were coarse, large, the surfaces markedly granular; the mitral and tricuspid valves were thickened; the surface of the lungs was puckered from induration around tubercles; the spleen was enlarged and firm, and its capsule thickened. Cases 3, 11, 27, 40, 44, 47, 49, 57, 67, 74, are all good instances of the same kind. Since the publication of this paper, we have met with the same condition not unfrequently, and will quote one more example of it, at rather more length. J. E., past middle age, a carpenter, of anæmic cachectic aspect, gave no other account of himself than that he had suffered from fulness and pain in the left chest, after eating, for some years. Valvular disease of the aortic orifice was detected, he got weaker, and died suddenly without any other particular phenomenon having presented itself. The apices of both lungs were puckered around old tubercular deposit. The aortic valves were contracted, and hardened, and thickened. There was cartilaginoid deposit to a considerable extent in the coats of the aorta, which had produced some contraction of the orifices of the coronary arteries. The liver was abnormally firm, and there was marked thickening and condensation of the Glissonian sheaths. The kidneys were very hard, their capsules were thickened, and their matrix; the tubes were infarcted, and contained fibrinous casts. Here there was change of a gradual kind going on in four different localities, which was marked by no prominent symptom, and which may with much probability be regarded as of like, if not of the same, nature. The most probable inference from the non-limitation of a certain state to one part is that it depends on some circumstance or condition which is common to all affected. It seems, therefore, more reasonable to believe that these several changes in separate localities resulted rather from some unnatural state of the blood, giving rise to unhealthy exudations in these parts, than from so many separate simple inflammations. We do not at all mean to urge this as a conclusive argument, we know it is very far from such. Moreover, this concurrence of like changes in separate parts is by no means constant; it is not present, we think, in even the majority of cases; it oftener is confined to two or three, than extends to a greater number. Still, it is a truth, and one we think of much significance, that this concurrence not unfrequently appears in a very marked manner, as in the case related; and that there are often slight traces of change discernible, which indicate very manifestly a tendency to such concurrence, even when it does not exist decidedly. Thus, we think, it favours the idea that cirrhosis of the liver depends on a general unhealthy state of the blood, if we find in an incipient, or not far advanced case, some thickening of the capsule of the spleen, and a white patch on the pericardium. It does not, however, at all follow, if our view be admitted, that changes of the kind in question should take place always in several parts, any more than it does in the case of tubercle. Scarce any one doubts that tubercle is essentially an exudation of a peculiar unhealthy liquor sanguinis; ordinarily this is effused in the lungs, but if the diathesis is intense, it may be deposited in many different parts.

In all the foregoing, we have used the term inflammation repeatedly, and perhaps our readers may think, without sufficient discrimination of the degree in which the process exists. This omission, however, has not been without a purpose, as we wished to use the term in a very general

sense, and to reserve our more particular remarks upon it to the close. Inflammation, we know, is a very complex process, consisting essentially in a peculiar disturbance of healthy nutrition. This disturbance, if we take a typical case, affects the regular equable supply of blood, and hyperæmic afflux and stagnation in the inflamed part result; it affects the nutrition and the vital endowments of the part, and they are suspended more or less completely; it causes increase of heat, pain or uneasiness in some degree, and swelling from exudation of serous and fibrinous fluid into the interstices of the tissue. Now, in a typical case of acute inflammation, occurring in a healthy person, all these several phenomena which we have enumerated will be well marked, and we can speak confidently of their presence. But when we descend the scale, and come to so-called chronic inflammation, the case is very different—one or other of the component phenomena, or parts of the process, is wanting, or scarcely discernible. Thus, the active hyperæmia may cease, and change into a passive congestion; or, on the other hand, may continue in a degree supplying the materials of a copious flux, without any symptom of congestion. The nutrition of the part may no longer be suspended, but increased, so that some degree of hypertrophy takes place, or be variously altered. The vital qualities of the tissue may be more or less perfectly restored, or variously perverted. Heat and swelling may have altogether disappeared. Now, it seems to us to be true, in a great majority of cases, that, as we depart from the type—acute sthenic inflammation—and descend to the lower grades, the distinctive features of the process become gradually effaced, so that at length we have no longer to do with morbid action the same in nature though slower in course, but with one which is materially different in its principal character. Acute inflammation, as it declines, may thus pass into a mere passive congestion, or into a flux from a mucous surface, or into an hypertrophy of a tissue. Now, we contend that these conditions, when typical, are no longer inflammations—the characters of inflammation have faded away, and are replaced by others. They may have had their origin in inflammation, or they may not, but they are processes substantially different from it.* The one we are especially concerned with is hypertrophy, employing the term for the present not in its exact sense. This hypertrophy, causing the increase and thickening of fibrous tissues, goes on and on, as a substantive independent process totally unassociated with any trace of inflammation, even though it may by possibility have originated in it. This statement we mean to apply to all the following instances: 1. All the thickenings of serous membranes which we have noticed, and the Pacchionian bodies; 2. Thickening and contraction of the cardiac valves; 3. The granular form of hepatic cirrhosis; 4. Fibroid change in the mucous and submucous tissue of the stomach; 5. Fibroid production in the testis, as in the case described; 6. Cirrhosis of the lung; 7. Fibroid production in the uterus, either in the form of tumour, or partial hypertrophy. We feel convinced that, in all these instances, the process may be from the first non-inflammatory, depending, we conceive, on the exudation of blastema tending abnormally to fibre-development, and not simply maintaining the nutrition of the part. We do not mean to exclude as an operative cause a deranged state of the assimilative power

* See Remarks on Chronic Inflammation in the 'Association Journal,' Dec. 9, 1853.

of the tissues, though we do not know how much we ought to attribute to it. We have another class of instances, which seem to us to differ from the first chiefly in the circumstance that the exudation appears in greater mass, and shows less tendency to organize itself into fibre. Under this we include—1. The semi-cartilaginous patches in the aorta and elsewhere in the arterial system; 2. The less-markedly granular form of cirrhosis of the liver; 3. Hypertrophic induration of the lymphatic glands; 4. The nuclear formations which encroach on the gastric glandular tubes; 5. So-called hypertrophy and atrophy of the brain; 6. Chronic pneumonia, as we have distinguished it; 7. Fibroid change in the placenta. The exudation in these instances shows itself to be of a fibrinous nature by its tendency to fibrefy, its passing into the state of a solid stromal or basis-substance, and its being associated in some cases with manifest deposits of fibrine in the same or other parts. The occurrence of these deposits in two of the cases recorded—that of J. S. and of C. K.—was of great significance; it gave a key, as it were, to the interpretation of the phenomena, and, by analogy, some aid to the correct diagnosis of other cases. That the change in the second class of cases is closely allied to that in the first seems to us pretty certain, from the occurrence of transitional instances, from the increased firmness and toughness which are met with in both, and from their being both connected apparently with the same general conditions. In the second class of cases, we think the evidence of their non-inflammatory character is even more decided than in the first; they seem to us most clearly to be essentially dependent on exudation of bad, unhealthy plasma. We have not included granular degeneration of the kidney in the second class, because it seems to us that a failure in the assimilative power of the renal structure is in some material degree concerned in the production of the change, and that it does not solely depend on the supply of unhealthy fibrine and albumen. We regard it as a change allied to the others by pathological affinities, but not identical with them. The formation of a fibrous tumour in the uterus or elsewhere seems to be just a step further beyond that of fibroid thickening. In the former, the character of growth, independent active growth, is predominant—it is a new organ; in the latter, this character, though it has begun to manifest itself clearly, is not so marked. Between fibroid formations increasing by true growth, and by mere addition of exudation, there are, no doubt, all possible grades. Fibroid changes in muscle are either the result of inflammation, or of atrophy from altered function; they do not belong to the degenerations we have particularly in view.

We would say a few words respecting the general grounds on which our view seems to us very probable. One of the vital phenomena which the blood presents, and certainly a very remarkable one, is that its fibrine continues in a fluid state, traversing numberless minute and intricate channels in combination with the serum of the liquor sanguinis, giving off new material, and receiving back old, as well as raw, half-elaborated supplies from without. The living cells which float in the liquor sanguinis, the several living solids which it traverses, all exert an unquestionable influence upon the composition of the blood; and it is only when the normal action of each is maintained that the healthy state of the nutrient fluid can be secured.

While the frame is in its full vigour and activity, braced by healthful and animating exertion, there is little fear of the purity of the blood being impaired, the vital actions of all the organs depurating and assimilating are vigorous, and not only are all effete matters quickly eliminated, but its own proper constituents are kept up to that condition in which they ought to be. There is little probability that in such a system degraded fibrine will separate and be precipitated, or exude here and there. But how different must be the condition of the blood which circulates in the system of a jaded son or daughter of toil, struggling with poverty and mental depression, and scarce even cheered by the fresh gales of heaven! Insufficient nourishment poorly repairs the necessary waste, the functions of the depurating as well as of the assimilating organs are languidly and imperfectly performed, and the very life of the blood itself decays. Under such circumstances we may be sure that trifling causes will be sufficient either to cause exudations of unhealthy plasma, or in some cases even coagulations of fibrine within the blood-vessels. The marvel which we have to call in the aid of vitality to explain is, why the fibrine does not coagulate, both in the vessels, and in their interstices, when it exudes in the business of nutrition. That it should do so occasionally, especially in depressed states of system, can be no matter of surprise. That the existence of hyperæmia, or any cause of irritation, will promote the occurrence of these unhealthy exudations there can be no question, but we conceive that we have ample evidence that it is nowise necessary. Of this the so-called baconny deposit affords a good example. This is a translucent, perfectly homogeneous, structureless substance, which is found infiltrating the liver and the spleen, and sometimes within the Malpighian tufts of the kidneys. It occurs in cases of marked cachexia from scrofula, syphilis, or morbus Brightii. One can only regard it as a form of unhealthy aplastic fibrinous matter, which exudes from the bloodvessels instead of the normal plasma, and solidifying in the interstices of the tissues, causes their atrophy, while itself goes on accumulating and causing great apparent increase in the size of the organ. Not even a zealous Broussaian could ascribe the exudation in this case to inflammation, the parts affected show no trace of it, and the history of the disease affords no symptom of its existence during life. Now it certainly does appear to us, judging both from the character of the process so far as we are able, and from the lowly organized nature of the exudation, that there is no very essential difference between the fibroid deposits of our second class, and those of baconny matter. The one is unorganized, the other is lowly organized, but this is the chief distinction between them.

The continuous uniform course of these affections is a point worthy of notice. We find them not unfrequently in what we must regard as a progressive state. For instance, we often see the liver in an early stage of cirrhosis, the characters of the change distinctly marked, but not in an extreme degree. Now, our observation of such cases has never shown us what the common account affirms, that the liver is, in the early period of the disease, much enlarged by the effusion of lymph and serum within it; all that we have seen in the early period is identical with what exists in the later, only that the amount of change is greater. The liver is indeed often enlarged in cirrhosis, but this is by the formation of much

fibroid tissue within it; at a later period this fibroid tissue shrinks, and contraction takes place, not, however, from absorption of the watery part of the effusion. So with regard to cerebral hypertrophy, it seems certain that the process is a continuous one, the symptoms of compression of the nervous structure become more severe to the last. Were the affection the result of a chronic inflammation, there would surely be a period at which exudation would appear to be taking place, and another in which that exudation would exercise compression. We could conceive atrophy of the brain much more than hypertrophy to be the result of chronic inflammation. Thickening of the cardiac valves, pulmonary cirrhosis, and fibroid hypertrophies of the gastric submucous tissue, appear to us to be continuous progressive changes, not only in the contraction which they induce, but in the formation of the cause of that contraction. The changes which take place in true inflammatory exudation contrast very strongly with those which belong to such as we have been considering. The matter exuded into a parenchyma either undergoes suppuration, or degenerates fattily, or in other cases forms a patch of induration never exceeding in size the original mass. If effused on a serous surface it forms adhesions which become delicate translucent bands of normal white filamentous tissue, and generally occasion no thickening of the serous membrane at the place of their attachment. Generally, the exudation in its progress diminishes and undergoes absorption, and does not continuously increase. How very wide the interval between such processes and that of cirrhosis, or extreme thickening of the gastric submucous tissue!

The case of fibroid degeneration of the placenta, communicated to us by Mr. Adams, is very suggestive as to the real nature of these exudations, and the kind of treatment most likely to prevent their occurrence. Most certainly no antiphlogistic regimen would ever avail in the least either to procure their removal, or to hinder their deposition. If there is any class of diseases to which we feel inclined to compare these changes, it is that of eruptions on the skin. We do not believe these to be purely eliminative disorders, like the sweats of acute rheumatism, on the excretion of lithates in excess by the kidney; but we think that the liquor sanguinis being itself unhealthy, occasions disordered nutrition in various parts. The matters thrown off from the skin contain nothing distinctive of the diseases, they are normal epithelial scales in the squamous disorders, and alkaline serum in the vesicular. Chemistry has hitherto discovered nothing particular in them. In the case where we have some knowledge of a materies morbi, viz., syphilitic infection, we can form no other conception of it than as a tainted and diseased form of animal matter, capable of communicating its unhealthy state to other animal fluids, and thus empoisoning the whole blood and system. If it were a distinct material thing dissolved in the liquor sanguinis, then one might conceive it possible to get rid of it solely by sweating, or purging, or some other way of elimination; but as every particle of matter is itself tainted, this is not possible, and hence we find our only efficient remedies are *alteratives*. It is not making a man spit a pint of saliva a-day that will get the virus out of his system, it is the long and steadily-sustained course of alterative treatment, by mercury and iodine, or both combined,

with care at the same time to raise or sustain the general power. This probably breaks up the morbid combinations, and creates healthy blood. The treatment of erysipelas by muriated tincture of iron, and that of low inflammation from poisoned wounds by bichloride of mercury, seems to have as its main object to exert a powerful alterative effect on the blood. When we cure non-inflammatory eczema by arsenic, as we can sometimes do in the most rapid manner, is it conceivable that we simply eliminate a materies morbi from the system? Must we not rather believe that we improve the quality of the blood, and change the nutrition of the skin for the better? Bichloride of mercury Sir A. Cooper is reported to have held as one of the best tonics; and certainly in the skilful hands of Mr. Startin we have witnessed abundant proofs of its efficiency in promoting the healthy nutrition of the skin when ulcerated, or otherwise diseased. This must be by its alterative action. In a different state of system, we think the internal organs may become the seats of exudations somewhat analogous to those which take place in skin diseases. We do not at all think there is any close similarity between the two classes; the one belongs to a much more impaired state of system, and to a later period of life than the other; but in the circumstance of both being in a measure dependent on the same cause, an unhealthy alteration of the liquor sanguinis, we think they are comparable.

We must now bring this rather tedious review to a close, and while we feel that we have been very unable to do adequate justice to the subject, and that our views may appear sometimes rather crude and unproven, we trust that we may have taken a step towards diffusing some more correct conceptions regarding a class of changes, which, though very common, have scarce ever been investigated from any general ground of view, but ascribed vaguely to "chronic inflammation," that general *asylum ignorantiæ.*

Handfield Jones.

Review V.

Traité de l'Angine Laryngée Œdemateuse. Par le Docteur F. Sestier.
A Treatise upon Œdematous Laryngeal Angina. By F. Sestier, M.D.—*Paris*, 1852. 8vo, pp. 470.

There are two descriptions of monographs upon practical medicine, each offering its respective advantage. The one is the result of long experience or special opportunity, and, when executed by a man of talent, constitutes perhaps the most attractive of all professional reading. Graphic description, philosophic appreciation, happy generalization, or important therapeutical conclusions, may here come into play, and rivet attention; and the perusal of such works constitutes epochs in the life of the student, and offers no mean compensation to the habitual toils of the critic. And even when more enlarged experience and improved modes of research may have shown some of the ideas developed to be fallacious or incomplete, enough of sterling value will often remain to secure for the author his niche in the temple of science, there to receive, ever after, the faithful homage of the devout few, who well know how much present progress is due to prior

exertion. The other kind of monograph is too often slightingly spoken of as a "mere compilation"—compilation being, in fact, in the present diffused state of medical science, one of the most useful works that can be undertaken, and requiring for its satisfactory execution great talent, though of a different order to that requisite for original production. To collect the *disjecta membra*, analyse and compare them, and often correct them by each other, and draw legitimate deductions from their consideration, is a task of no slight difficulty or mean utility. It is rendered all the more difficult by the dissimilarity of the materials, and the different powers of observation of, and amount of accuracy observed by, those who have recorded them: and, but for discrimination and care, unwarrantable conclusions may be paraded forth as based upon an imposing mass of facts, while want of skill or industry in the explorer may leave legitimate deductions undiscovered, or unseparated from the dross in which they are enveloped.

The writer of an original monograph, having observed all his facts from one point of view, and measured them by the same standard, is enabled to produce a very complete picture of what he wishes to represent; but he runs the risk of being dominated during his researches, and the exposition of their results, by one-sidedness. Could the compiler rely upon the exactitude of his materials he would be in a position to draw more impartial conclusions; but his danger arises from the comparison of facts which are not, or only imperfectly, comparable. M. Sestier, in the work we are about to notice, reiterates the complaint, that must so often arise to the lips of those who are engaged in examining the original records of cases, of the incompleteness with which the symptoms and pathological appearances are recorded, the observers usually noting only some of the positive appearances, and making little or no mention of the negative ones; so that he who wishes to compare these accounts does not know whether the omissions are due to the absence of the phenomena, or to the ignorance or carelessness of those who should have noted them.

Of the second class of monographs mentioned above, M. Sestier's treatise is a most favourable specimen; as, indeed, might have been expected, from the fact of M. Louis' *imprimatur* being affixed to it. The style is as unattractive as that of a manual, but the information conveyed is copious and valuable. To a few original cases (15), observed by or communicated to him, he has added the results of extensive reading, and has thus amassed a sum of 274 cases to work upon, 132 of which have furnished necroscopic results. No indiscriminate use has been made of these facts; but they have been analyzed and re-analyzed, and cross-questioned in a way well calculated to extract all the truth they contain, and to eliminate sources of error as far as possible, many of them, only available from their incompleteness for the illustration of special points, being rejected as grounds for general deductions. It may seem a large book for the illustration of what is rather an epiphenomenon than a substantive disease, and perhaps some of the repetitions of summaries of results might have been advantageously omitted; but it will be easily seen this is an error on the right side. Of a work, so completely analytical itself, we can be expected to give no very detailed account; but we may place the general results before the reader.

I. *Nature and Pathological Anatomy of the Affection.*

Its essential character is an *infiltration of the cellular tissue of the arytenoid-epiglotteal folds.* This rarely is found in a simple condition, independent of all local phlegmasia; but usually traces its origin to some acute, subacute, or chronic inflammation of the throat, larynx, or neighbouring parts. For the most part, too, besides the local phlegmasia, a spasmodic condition of the glottis is also present. M. Sestier considers the term *œdema glottidis,* by which the affection has been usually designated, a faulty one, the upper orifice of the larynx being much oftener the seat of the effusion than the *cordæ vocales.* In going over published cases, he has, too, found considerable embarrassment produced by different authors designating various parts of the larynx as the glottis. The effusion is, however, not always confined to the arytenoid-epiglotteal folds, and is frequently found under the epiglottis, the interior of the larynx and the fauces, extending in rare instances even to the trachea and bronchi. Each of these localities is passed in detailed review by M. Sestier.

Usually, both *arytenoid-epiglotteal folds* are affected, and to the same extent, but occasionally only one side is so. More or less obstruction or deformity of the upper orifice of the larynx results; but this is by no means always found, after death, to be proportionate to the amount of difficulty of respiration; and that because the tumefaction may have in part subsided, while much of the difficulty during life may have been due to spasm. The effusion has been found to be serous in seven-ninths of the cases, and sanguinolent or purulent in two-ninths.

In the 81 cases in which the condition of the *epiglottis* has been recorded, it has been infiltrated in 74, acquiring sometimes a very considerable size; and, as its tumefaction is almost always in direct relation to that of the arytenoid-epiglotteal folds, its exploration may prove very useful in diagnosis and prognosis. *Intra-laryngeal* infiltration has been found, in 52 of the 72 cases in which the incision of the larynx has been noted, it being sometimes general, and at others only partial—the *cordæ vocales* usually being implicated, and a narrowing, or even obliteration of the glottis, resulting. As the obstruction of the *cordæ* is a fixed one, there is not merely an impediment to inspiration, as in the valvular obstruction offered by the arytenoid-epiglotteal folds, but likewise of *expiration;* and the danger is proportionally increased by there being now two obstructions, and the more complete character this one assumes. Œdema of the *fauces* is pretty frequently met with, but is often only partial: it is of importance as announcing the probability of intra-laryngeal infiltration, especially in patients suffering from anasarca. Among 132 patients, œdema of the *trachea* has been met with but six times, and of the *bronchi* but once.

II. *Etiology.*

1. *Influence of Affections of the Throat, Larynx, and Neighbouring Parts.*—Simple inflammation of the *throat,* independently of affections of the larynx, has been noted as preceding it in 56 cases, and especially

between twenty and fifty years of age. Of 54 cases, 36 occurred in men and 18 in women. Of persons attacked during health, however, 18 were men and 13 women; while there were 18 men to 5 women who were attacked while suffering under other diseases. Frequent as is the occurrence of *diphtheritis*, there are only 5 cases recorded in which it has accompanied this affection. Of cases in which *laryngitis* was the cause, 89 have been collected, in all but 13 of which prior guttural inflammation occurred. In only 3 cases of *croup*, from among a great number examined, was this lesion present. Acute *necrosis* of the *larynx* has been observed, in combination with the infiltration, 14 times; 12 of these cases occurring during the convalescence of typhoid fever. *Chronic laryngitis* was the cause in 45 cases, 14 of these occurring in phthisical, and 14 in syphilitic patients—17 not being specified. Of the *circum-laryngeal* affections capable of inducing this œdema, may be mentioned cervical infiltrations of any kind, or cervical, glandular, or solid tumours.

2. *The Influence of other Diseases, besides those of the Throat and Larynx.*—M. Sestier enumerates various diseases, which in a few cases seem to have contributed to the production of the affection—as pneumonia, erysipelas, rubeola, scarlatina, variola, &c.; but of all of these, *typhoid fever* has been most remarkably predisposing. Of 23 cases which have occurred during its course, 18 did so during convalescence, and in 12 of the number necrosis of the larynx existed. Among the 217 cases, only 20 examples of anasarca, or the serous diathesis, are noted; and then the co-operation of phlegmasia of the throat or larynx was almost constantly observed.

3. *Influence of Sex, Age, and previous Health.*—Two-thirds of the cases recorded were of the male sex. In none of the varieties of the disease have females exclusively suffered; but men have been exclusively the subjects of the angina when it has succeeded to necrosis of the larynx, disease of the heart, paludal cachexia, and wounds of the throat. Men have been almost exclusively attacked when it has followed typhoid fever, and their numbers have much preponderated after guttural angina or laryngitis, coming on during other diseases, in angina produced by solid tumours in the cervical region and in the serous diathesis. The sexes have been nearly equal when it has followed guttural inflammation in healthy subjects, syphilitic laryngitis, and the pressure of cervical glandular tumours. In one affection alone has it been oftener met with in females—viz., diphtheritis. As to *age*, the affection is very rare in infancy; less rare between five and fifteen; and attains its maximum between eighteen and fifty, but especially so between eighteen and thirty-five. After thirty-five it continues diminishing, and especially so after fifty-five. In a little less than one-fifth of the cases the attack occurred in *full health*; and in a little more than four-fifths, during the course of the convalescence of other diseases, especially typhoid fever.

4. *Influence of Profession, Season, &c.*—Among 99 cases in which the nature of the *occupation* is noted, this was active in 61, sedentary in 14, and mixed in 24. But of 21 patients in whom guttural inflammation had induced it, 15 had active, 1 sedentary, and 5 mixed occupations; while among 19 cases consecutive to chronic laryngitis, 8 followed active, 6 sedentary and 5 mixed occupations. Among 17 cases preceded by typhoid fever, there were 10 soldiers. Among 111 cases, 66 occurred

during the *winter*, and 45 during the *summer;* but in 22 cases following guttural inflammation in healthy persons, 9 took place in winter and 13 in summer; while of 18 following guttural inflammation occurring in persons suffering from disease, 13 were observed in winter and 5 in summer. Of 20 cases from chronic laryngitis, 13 occurred in winter and 7 in summer. In 28 cases, the disease was referred to *exposure to cold.*

III. *Symptoms and Course of the Disease.*

In four-fifths of the cases some degree of pain, or of the feeling of a moveable foreign body at the top of the larynx, was early complained of. The voice is noted as altered, being at first feeble and hoarse, and becoming at last nearly or quite extinct. The respiration is always embarrassed, suffocative paroxysms occurring at intervals. The inspiratory movements are especially laboured; but when the interior of the larynx is also affected, expiration may be equally difficult. The cough is short and stifled, and is preceded by the sensation of a foreign body in the larynx. By auscultation we find the pulmonary murmur is much enfeebled, and masked by the abnormal *souffles* and *râles* heard in the region of the larynx. Deglutition is usually difficult, and sometimes impossible. On inspection, œdema of the uvula and of the velum palati will often be observed, the epiglottis being also much swelled, and sometimes rolled back on itself. The *pathognomic* indication of the disease is obtained by passing the forefinger to the seat of the effusion; but although most valuable information may be thus obtained, it often happens, from the inflamed state of the throat, or the spasmodic resistance of the muscles, the attempt even cannot be made; or if the finger is passed down, its contact is too transient to obtain the desired information. In many cases it is not mentioned whether such passage had been attempted; but in 44 at least it was performed with success. The patient usually remains seated on his bed, his face being of a leaden pallor, his lips violaceous, and his expression exquisitely anxious. Fever is absent, or present in variable degrees. Sleep is difficult or impossible. In relation to the *invasion* of the disease, it is to be borne in mind, it often comes on during other affections, and is not unfrequently preceded by œdema of the fauces. In some cases it comes on quite gradually, but in others almost suddenly. In 30 out of 35 in which the time was noted, it came on in the evening or at night. The dyspnœa, which is the dominant characteristic of the disease, is sometimes continuous, but in about three-fifths of the cases it occurred in paroxysms of varying violence, which were especially induced by the horizontal posture, attempts to swallow or speak, coughing, emotions, and the evasion of sleep at night. In the intervals the larynx never regains its normal conditions. The *duration* of the disease is very variable, from some minutes to several weeks—the mean duration being about 4 days, in cases dying without operation. The form of the disease following guttural inflammation is remarkable for the rapidity of its termination, as is that connected with anasarca. The cases connected with laryngitis are often of slower progress. The fatal *termination* sometimes occurs during or just after a paroxysm, and at others during a deceptive calm, it being not seldom sudden and unexpected. Of 51 deaths, 35 occurred between 10 P.M. and 10 A.M., and 16 between 10 A.M. and 10 P.M.

IV. *Diagnosis.*

This is sometimes rendered difficult by the absence of symptoms which are usually present, and especially when the affection occurs during diseases inducing coma or adynamia. The larynx should be carefully ausculted, and on any *souffle* being heard, tactile exploration should be resorted to. The presence of *intra-laryngeal œdema* both obscures the diagnosis and adds to the danger. It, however, is never met with except in patients suffering from other diseases at the time of the attack, nor in healthy individuals attacked with guttural inflammation. In the few cases of this last in which it has occurred at all, the patients have been already ill. In laryngitis this form is to be expected, and especially when it occurs in the serous diathesis. If there is marked difficulty of expiration, this form is very probably present, and especially if there be not prior laryngeal disease explaining this. The fauces should also be inspected, as in 15 out of 17 cases in which they were œdematous, intra-laryngeal œdema was present. The diagnosis of this angina from the different affections of the throat and larynx is given in considerable detail.

V. *Prognosis.*

Of 213 patients, 158 succumbed, 30 of them in spite of bronchotomy. There were 55 recoveries, bronchotomy being resorted to 20 times. Among the circumstances influencing the mortality are—

1. *The Origin of the Angina.*—That following guttural inflammation is the least dangerous, the recoveries amounting in previously healthy subjects to one-half, and in slight inflammation to three-quarters; but when this occurs in the subjects of other diseases, only a quarter recover, and if the inflammation is intense the angina always proves fatal. The whole of the 14 cases of angina consequent on necrosis of the larynx occurring in typhoid fever died, notwithstanding bronchotomy was performed in several. In chronic laryngitis three-quarters died, bronchotomy often failing—the mortality being three-fifths in syphilitic laryngitis, and six-sevenths in tubercular.

2. *Condition of the Larynx.*—The mortality is much less when the larynx is previously healthy than when it is the seat of important lesions—death occurring in about two-thirds of the former cases, bronchotomy then often succeeding; while in the latter it occurred to five-sixths, bronchotomy almost always failing.

3. *Prior Condition of the Patient.*—When the patient has been in previous good health, the mortality has only been half, and bronchotomy has often succeeded; while in persons suffering from other diseases it has risen to five-sixths, bronchotomy almost always failing.

4. *Age and Sex.*—The mortality has been much less from 30 to 40 and 40 to 50 than from 50 to 70—its maximum occurring between 10 and 30. That of males has been four-fifths, and of females three-fifths. Bronchotomy has failed much oftener in males than in females. These differences as to age and sex are due to the unequal occurrence of the mild and severe forms of the disease in the two sexes and at different

VI. *Treatment.*

This requires to be resorted to with promptitude, and where it has been so rapid cures have sometimes resulted. Insidious remissions are, however, especially to be guarded against. No one remedial agent can be relied upon, but a variety must be employed simultaneously or in quick succession. As a general rule, the more direct the infiltration can be attacked the better, general therapeutical agents being employed chiefly as preparatory and adjuvatory to this.

In the indirect or medical treatment of these cases, *blood-letting* is an important agent. But even in cases in which it is distinctly indicated it is alone insufficient, and the attempt to vanquish the disease by its reiterated employment fails, and only exhausts the powers of the patient. A *large blister* applied over the front of the neck should hardly be ever omitted, it being as important an agent here as is free vomiting in croup. When the patient can swallow, and is not in too prostrate a condition, *emetics* are often of service; and *purgatives*, especially croton oil, have proved of great service. *Mercurials*, too, are well spoken of. It is, however, from *direct or surgical means* our chief hopes are to be derived; and passing by the application of alum and nitrate of silver, each of which appears to have been useful in a few cases, we come to *scarification of the infiltrated parts*, when accessible. Of 17 cases in which this was resorted to, 12 recovered, and 2 were ameliorated, other means being also employed in most of them. In 23 instances in which incisions, combined with pressure, were made experimentally after death, the fluid was easily discharged in 10, with difficulty in 6, while in 7 none flowed out. The scarifications are more likely to prove useful the nearer the œdema approaches the passive condition, less likely when it is dependent upon inflammation of the larynx or throat, especially if this last is violent. They are particularly indicated in the angina coming on in individuals already much debilitated, in which state other means have so little field for employment. Unfortunately they are inapplicable to the intra-laryngeal form, which is so fatal. M. Sestier describes the mode of scarifying pursued by Lisfranc and Buck; and he proposes two new instruments for facilitating the operation. One of these consists in a myrtle-leaf scarificator cutting at each edge, and the other combines a scarificator and flattened forceps, by means of which scarification and compression of the parts are simultaneously accomplished. He gives representations of these instruments as they are made by Charrière.

When, in spite of all means employed, the disease, as is usually the case, gets progressively worse, time should be endeavoured to be gained by having recourse to *bronchotomy*. This has succeeded in two-fifths (20 out of 50) of the cases in which it has been resorted to, while the recoveries of cases in which it has not been had recourse to have amounted to less than a quarter; while, however, it succeeded in little less than two-thirds of the cases occurring in healthy individuals, it saved little more than one-sixth of those already suffering from disease. The chapter upon the application and mode of performing this operation is full of interesting details; but we must pass them by, not only because our space is exhausted, but also because we have already given some account

of this part of the subject, when noticing a former publication by M. Sestier, in which it was treated apart.*

M. Sestier devotes a good deal of space to the examination of the question, whether, in urgent cases, a gum-elastic tube should not be passed into the larynx. Although he does not consider that this would form a proper substitute for bronchotomy where this operation can be performed, yet, when the patient refuses to submit to it, or from the tumefaction of the neck, &c., its performance is impossible, he thinks the tube should be passed. In like manner it should be employed if the patient has just fallen into a state of exhaustion, rendering it doubtful whether he is dead or not.

John Chatto.

Review VI.

The Subject-Matter of a Course of Six Lectures on the Non-Metallic Elements. By Professor Faraday; arranged by J. Scoffern, M.B.—*London,* 1853. 12mo, pp. 293.

Not a few of the most ardent admirers of Professor Faraday are inclined to think that his public lectures are among the most useful as well as brilliant of all his labours; for although the masterly researches of this great philosopher have done much for the adept, by elucidating some of the most obscure points in natural philosophy, yet his oral discourses have accomplished an equally grand result, by instructing the people in the great truths of science, and diffusing a taste for the cultivation of the higher faculties with which man is endowed. Many, indeed, have felt the powerful influence of his teaching, and have thought, while listening to his orations, how glorious must be the study of nature, even for its own sake.

We doubt not that this volume will be very generally read, in the hope that it may give some idea, if but an imperfect one, of the eloquence of the lecturer, and of the lucid and admirable manner in which he is accustomed to treat the most difficult and abstruse points of chemical philosophy; but we fear, with the editor, "that a mere verbatim report of an experimental course of lectures will by no means render, under a literary aspect, the spirit in which these lectures were delivered;" for they are necessarily deficient in one great essential, namely, "the *demonstration of experiment,* that mute eloquence of action which silently compresses whole pages of written lore into one short act of manipulation, and renders verbal explanation unnecessary." This deficiency the editor has endeavoured to supply in the form of copious notes, but it must be admitted that they fall very far short of accomplishing the object intended.

Our readers will be able to judge of the scope of these lectures from the following quotation:

"I do not propose to treat the subject in a purely chemical sense; to discuss the non-metallic elements in the order of their discovery; to pass under notice the various theories of which these elements have been the subjects; or even to make

* See British and Foreign Medico-Chirurgical Review, vol. viii. p. 267, July, 1851.

known all their minute characteristics. My object is rather to treat of them broadly; to point out their more striking features; to consider. them not only as chemical agents, but as fulfilling each its appointed function in the material universe." (p. 66.)

Among the many facts which are thus broadly depicted by Professor Faraday, there is one which is beginning to assume considerable importance. For a long time past the chemist has been aware that the same substance may present itself in different aspects—as in the form of a solid, a liquid, or a gas; and it may even exhibit different chemical as well as physical properties. This is the case with sulphur, which may be either yellow, crystalline, and brittle, or brown, amorphous, and elastic; with carbon, which may be black and formless, as in charcoal,—opaque and crystalline, in plumbago,—or colourless and pellucid, as in the diamond; with phosphorus, which may be white, black, or colourless; and with iron, which may rapidly dissolve in nitric acid, or remain passive therein. In most of these cases, the difference of property was thought to be referable to a difference of temperature, or to a difference in crystalline structure. Sir Humphrey Davy thought it might be due to a difference in electrical condition; and Professor Graham hazarded an opinion that it might be dependent on a difference in the proportion of combined heat. With these vague speculations the subject was dismissed; and the facts relating to it were not considered to be of sufficient interest to demand especial attention. By degrees, however, they have grown into importance. The investigations of Frankenheim into the peculiar dimorphic forms of sulphur, and a few other substances; those of Thenard, Rose, Marchand, and Schrötter, into the different modifications of phosphorus; those of Mercer into the active and passive states of chlorine; and above all, those of Schönbein, Marignac, De la Rive, Williamson, and Osann, into the properties of that remarkable body, ozone, have given a new aspect to the whole subject. It is proper, however, to state that, as early as 1842, Berzelius entertained an opinion that these peculiarities of property were deserving of attention; he therefore collected the facts which had reference to them, and published a list of those elementary substances which had the power of assuming two or more forms. The result of his investigations was, that this faculty, hitherto thought to be so rare, was of such common occurrence, that it must be regarded as the rule rather than the exception. He gave the name of *Allotropism* to the subject—choosing this term, which is derived from αλλος, another, and τροπὴ, change, because the word isomerism, which had been hitherto used, was already engaged to denominate a similar quality possessed by certain *compound* substances. He also took advantage of a suggestion offered by Frankenheim, and employed the Greek letters α, β, γ, &c., to designate the several varieties of form assumed by the same element.

We will now follow the lectures of Professor Faraday, and review the facts of Allotropism in the order in which they are there discussed.

1. *Oxygen.*—This element has the power of assuming three distinct conditions: it may be *passive*, as we find it in the atmosphere; *extremely active*, as it is during combustion; and *semi-active*, as when in the form of ozone. The history of the discovery of this body is full of interest. About ten or twelve years ago, Professor Schönbein, of Bâle, was induced

to investigate the cause and nature of the peculiar smell emitted during the voltaic decomposition of water, and during the excitation of an electrical machine! It had been observed that the same odour was often manifested during a thunderstorm, and that it was generally evolved from bodies which had been struck by lightning. Schönbein soon found that the principle was material; for he could collect it in bottles, and preserve it for a considerable time. He noticed, however, that it was quickly destroyed by heat, and that it had the property of oxydizing most of the common metals. He next remarked that it was liberated only at the positive pole of the battery; and then he discovered that he could manufacture it in large quantity by exposing a stick of moistened phosphorus to the action of atmospheric air. Pursuing his investigations, he observed that it was produced under a variety of circumstances—that it was formed when atmospheric air, mixed with the vapour of ether or turpentine, was exposed to the rays of solar light, or to the influence of a hot glass rod; that it was also developed when the red fumes of hyponitrous acid were brought into contact with water or aqueous vapour; and that it was likewise formed during the action of dilute nitric acid on all the common metals except tin. He found it in the atmosphere, in the rain that fell during thunderstorms, and also in the morning dew: so that ozone appeared to have a very universal existence.

Schönbein's papers on the subject awakened attention, and Marignac, among other chemists, took up the inquiry. He showed that the best mode of generating ozone was to pass atmospheric air through a glass tube, containing fragments of phosphorus moistened with water. In determining the circumstances under which it is produced, he noticed that it is not developed in dry air, in air deprived of oxygen, or even in pure oxygen itself; but it is generated in artificial mixtures of oxygen with carbonic acid, nitrogen, or hydrogen. He found also that very minute traces of nitrous acid, hyponitrous acid, olefiant gas, or ether, entirely prevent its formation.

The properties of ozone are very characteristic. It is a gaseous body, having a peculiar odour, which, in a concentrated state, resembles that of chlorine, but when diluted with atmospheric air it is similar to that of phosphorus. It is an irritating substance, producing pain and inflammation of the bronchial membrane, and acting as an energetic poison on small animals. It is not very soluble in water; and is not decomposed by chloride of calcium or strong oil of vitriol. It discharges the blue colour of litmus or indigo with the energy of chlorine. It oxydizes most substances with great rapidity—converting phosphorus, arsenic, antimony, lead, iron, and silver into their highest states of oxydation; changing the protosalts of tin, iron, lead, and manganese into the persalts or peroxides; transforming nitrous and sulphurous acids, whether free or combined, into nitric and sulphuric; and it even has the power, in the presence of a fixed alkali, of oxydizing nitrogen itself, and generating nitric acid. It rapidly destroys the compounds of hydrogen with sulphur, selenium, phosphorus, iodine, arsenic, and antimony. It changes many metallic sulphurets into sulphates, and iodides into iodates. It converts yellow prussiate of potash into red; and, finally, it produces oxydizing effects upon most organic substances.

The test which has been recommended for discovering the presence of ozone is the following: Dissolve 1 part of iodide of potassium in 200 parts of water, then add 10 parts of white starch, and boil for a few minutes. Saturate white filtering paper with this solution, dry it, cut into strips, and preserve in a stoppered bottle ready for use. When the test paper is exposed to an ozonized atmosphere, and then moistened with water, it turns blue.

There have been many curious speculations concerning the nature of this body. Schönbein at first supposed that it was a new element, analogous to chlorine, iodine, and bromine; he even thought it resulted from the decomposition of nitrogen; and many opinions were hastily advanced respecting the probable influence of Schönbein's discovery on the sciences of chemistry and meteorology. "The part," said one author, "which nitrogen takes in meteorological phenomena would become important, and the production of atmospheric electricity itself might be brought into connexion with the decomposition of that gas." Another chemist supposed that ozone was an oxide of nitrogen, isomeric with nitric acid; but when it was shown that it might be generated under circumstances which excluded the access of nitrogen; then it was regarded as a compound of oxygen and hydrogen—homologous to Thenard's peroxide, but not identical with it. This was the view which Schönbein advanced at the meeting of the British Association in 1845; but the researches of Marignac and De la Rive proved that it consisted of oxygen only, and that it was, therefore, an allotropic form of this gas. Schönbein was for a long time unwilling to admit the truth of this statement, and hence the chemical world was divided in its opinion concerning the nature of ozone. Marignac, De la Rive, Berzelius, and Faraday considered it to be allotropic oxygen, while Schönbein, Williamson, and some others thought it was a peroxide of hydrogen; but it appears from a paper which has been recently published by M. Baumert, in Poggendorf's 'Annalen,' that both of these opinions are founded in truth; for he states that when water is submitted to voltaic decomposition, the ozone which appears at the positive pole is a teroxide of hydrogen, similar in its constitution to hyponitrous acid, and probably produced by the union of nascent oxygen with water; but that when pure dry oxygen is submitted to the influence of the electric spark, the ozone, which is then generated, is allotropic oxygen, so that two things have evidently been confounded under one name.

And now let us ask what are the uses of this body in the great economy of nature, and what are the functions which it usually performs? It exists in the atmosphere at all times, and, during cold weather, it is developed therein to a considerable extent. Schönbein thinks that it is frequently the cause of epidemic disease. In the winter of 1847 he noticed that catarrhal affections were very prevalent at Bâle; and he likewise observed that ozone was very abundant in the atmosphere. Subsequent investigations have led him to believe that there is a direct relation between the amount of ozone in the air and the extent of catarrhal disease. This opinion has been put to the test by several physicians, and it has been affirmed by Polli, Heidenrich, Spenglers, Quetelet, and Moffatt that it is founded on fact; but it requires a great number of independent researches before the truth of such an hypothesis can be

fully admitted. That ozone plays a very important part in the economy of nature there cannot be a doubt; for its powerful oxydizing influence must be exerted wherever it abounds; and it is worthy of remark that ozone is more abundant in the air of the ocean than in that of the country, and in the atmosphere of the country, than in that of large towns. This seems to prove that it is employed in oxydizing the products of living beings. In fact, it is probable that that kind of change which we denominate decay, or eremacausis, is the result of its action on dead organic matter; and when we contemplate the enormous extent and importance of this kind of slow combustion which is constantly going on over the whole surface of the globe, we cannot hesitate to admit that this function performed by ozone is highly beneficial.

"And here let us reflect awhile on the fallacious interpretations we give to the phenomena of nature. The majestic phenomena of combustion bespeak our observation and rivet our attention, because of their imposing grandeur; yet these are but spasmodic efforts in the grand economy of the material world,—occurrences of now and then. The slower, but continuous progress of the elements to their appointed resting-place,—the silent, tranquil, ever-progressing metamorphic changes involved in the phenomena of decomposition and decay, these count for nothing and pass unheeded by. Yet with all their majesty—with all their brilliancy—all their development of tremendous energy, what are the phenomena of combustion in the grand scheme of the universe compared with these? When the loud crash of thunder, or the lightning's flash, awakens us from our thoughtless abstractions or our reveries, our feelings become impressed with the grandeur of Omnipotence, and the might of the elements he wields; yet the whole fury of thunderstorms—what is this in comparison with those electric energies which silently and continuously exert themselves in every chemical change! Why, the electric force residing in a single drop of water, and disturbed when that water is decomposed, is, of itself, greater than the electricity of a whole thunderstorm. Those of us who merely look to the brilliant phenomena of nature appreciate but little the grandeur of her forces! Those of us who limit our appreciation of the powers of oxygen to the energies displayed by this element in its fully active state, form but a very inadequate idea of the aggregate results accomplished by it in the economy of the world! Let us for an instant contemplate the enormous amount of oxygen employed in the function of respiration, which may be considered in the light of a slow combustion. For the respiration of human beings, it has been calculated that no less than one thousand millions of pounds of oxygen are daily required, and double that quantity for the respiration of animals, whilst the processes of combustion and fermentation have been calculated to require one thousand millions of pounds,—that is to say, twice four thousand millions of pounds of oxygen have been calculated to be necessary altogether—including the amount necessary in the accomplishment of the never-ceasing functions of decay. As stated in pounds we can hardly create to ourselves any definite idea of this enormous amount; the aggregate is too vast, too overpowering. It is scarcely to be grasped by our senses when reduced to tons, of which it corresponds with no less than 7,142,847 per day." (p. 111.)

This leads us to ask whether it is not probable that the oxygen admitted into the animal economy during respiration does not become changed into its allotropic or semi-active state before it performs the function assigned to it, and whether the affinity which is exerted between such oxygen and the effete tissues of the body, may not, as Dr. Draper supposes, assist in the circulation of the blood through the capillaries? We perceive here a wide field for investigation, and expect that ere long it will be productive of important results.

2. *Chlorine.*—For some time past it has been known that this element has the power of displacing hydrogen in many organic compounds without destroying their integrity, or even altering their leading chemical and physical properties, notwithstanding that the two gases are as much opposed as possible in their electro-chemical relations. To account for this extraordinary fact, it was surmised that chlorine might be an allotropic body, having the power, like oxygen, of assuming two conditions, namely, the active and passive. The truth of this supposition has recently been demonstrated by Professor Draper, of New York, who has shown that ordinary chlorine, which is generally passive, may be rendered active, or may become tithonized, as he expresses it, by exposure to heat, to the sun's rays, or to spongy platinum; and it then possesses properties which indicate a great exaltation in its combining energies. In the case that we have just referred to, it is probable that those particles of chlorine which remove the hydrogen from the organic compound are in an active state, while those which take its place therein are passive.

3. *Sulphur.*—This substance has the power of assuming three different aspects. In one it is transparent, pale yellow, and is crystallized in right rhomboidal pyramids or rhombic octohedra; in another it is opaque, deep yellow, and is crystallized in oblique rhombic prisms; and in the third it is opaque, amorphous deep brown, and has the consistence and elasticity of India rubber or thick glue. These remarkable changes of property are occasioned by differences in the temperature of the body at the moment that it solidifies, for the first form is produced when sulphur is crystallized from a cold solution, and the other states are brought about in the following manner:

"Taking a little common yellow sulphur, I melt it in a Florence oil flask, by means of a spirit lamp. Carefully applying the heat, it fuses, and the liquid of fusion is then pellucid and transparent. If I pour a portion of this into some cold water, it condenses into the state which it had before melting—that is to say, of common yellow brittle sulphur. I now apply a stronger amount of heat, and the transparent, colourless liquid matter suddenly thickens and becomes black; so that the Florence flask may now be inverted without any of the sulphur coming out. If, however, the heat be still increased, the black, tenacious sulphur once more becomes liquid and gives off a vapour. Now, the vapour of sulphur from this black compound, and its effects, I shall have to bring under your notice by and by. It appears to be endowed with properties different from those possessed by common yellow sulphur—more powerful, more exalted, more energetic; its tendency to react chemically being increased—just as in the chemical tendency of oxygen when it assumes the peculiar state of ozone.

"If sulphur in this black liquid state be suddenly poured into cold water, it assumes and retains a very peculiar condition. No longer yellow and brittle, like ordinary sulphur—like the result of pouring into water the first product of fusion—we, however, now produce a substance like strips of India rubber, or gutta-percha, in its external characteristics, which may be, and is, applied whilst in this condition to take impression of seals, and which may continue in this second state for days, or even longer." (p. 232.)

4. *Phosphorus* presents itself in four different forms. It is colourless and transparent in common phosphorus, white and opaque in that variety described by Rose and Marchand, black and opaque in that by Thenard and Osann, and dark red in the variety recently obtained by Schrötter. These different conditions are, as in the case of sulphur, produced by

alterations of temperature; and the general physical and chemical properties of the first and last varieties are very peculiar.

"Common phosphorus is remarkably combustible; tending to burst into flame on the application of very slight friction or a low degree of heat; a quality which renders it well adapted to the purpose of forming lucifer matches. The quality of its colour, and its physical condition as to softness, are also points of comparison. Well, here is a lump of allotropic phosphorus, and you will observe the difference between the two. In the first place, the colour is totally different, that of the allotropic variety being dark;—then the fracture is different, that of allotropic phosphorus being harshly brittle;—but the most striking difference between the two varieties of phosphorus is brought out by the application of friction, or of heat. Common phosphorus we are obliged to keep in water, for the purpose of guarding against spontaneous combustion; allotropic phosphorus, however, may be kept unchanged in atmospheric air; indeed, it may be wrapped up in paper, and carried in the pocket even, with the most perfect impunity; and in this way Professor Schrotter quite surprised us by his temerity, until we at length gained confidence, and became acquainted with the real qualities of the new substance. Common phosphorus when rubbed takes fire; the allotropic variety, however, may be rubbed with impunity up to a certain point, after which its combustible qualities are brought out. But the extreme use of allotropic phosphorus in the arts will not be comprehended until you are informed of the frightful ravages produced by the vapours of common phosphorus on those who are subjected to their influence, as is the case in manufactories of lucifer matches. Persons thus situated are afflicted with a disease which corrodes, ulcerates, and destroys their bones, causing the most horrible torture, and frequently death. The employment of allotropic phosphorus is attended with no such calamitous results; and being capable of changing into ordinary phosphorus on the application of an adequate amount of heat or friction, it answers perfectly well for lucifer matches, and indeed for most of the ordinary applications of phosphorus.

"In many other respects these two conditions of phosphorus present differences. Thus, for instance, the power of solution in menstrua is different. Common phosphorus readily dissolves in bisulphuret of carbon, whereas allotropic phosphorus does not." (p. 241.)

Besides this, it is stated by Dr. Devry that Schrötter's phosphorus is not poisonous, like ordinary phosphorus, when it is administered internally. He has given as much as 46 grains of this substance to animals, without other effect than that of relaxing the bowels.

This variety of phosphorus is produced by exposing ordinary phosphorus to a temperature of from 420° to 480°. The experiment is conducted in an atmosphere of nitrogen, hydrogen, or carbonic acid; and the result is more speedily effected if the sublimed phosphorus is at the same time exposed to the influence of solar light. Mr. Albright, of Birmingham, possesses the patent for the manufacture of this substance on a large scale.

5. *Carbon.*—Chemists have long been acquainted with the three different aspects assumed by this element. As common charcoal it is amorphous, opaque, and very combustible; as plumbago, it is crystalline, opaque, semi-metallic, and not very combustible; and as the diamond it is brilliant, pellucid, colourless, and very incombustible. Besides which there are differences in specific gravity, specific heat, and in other properties, which would be sufficient, were it not for the results of analysis, to support the opinion that these three varieties of matter are composed of elements essentially different.

Lastly.—Examples might be furnished of the allotropic states of selenium, arsenicum, antimony, tellurium, silicium, chromium, titanium, uranium, tin, copper, iron, nickel, and manganese; but sufficient has been advanced to demonstrate the leading facts of the subject, and to establish their importance.

It will be evident, from a little consideration, that there are two kinds of allotropism manifested by elementary bodies. In one there is merely an exaltation of property, already possessed, and not a new condition; this is the case with chlorine, oxygen, and iron—elements which present themselves to us in two states—namely, the active and passive. In the other, the property of the substance is entirely changed, and the body presents itself to us in an altogether different aspect. This is exemplified by sulphur, phosphorus, and carbon; and it is, of the two kinds of allotropism, by far the most important.

And here we may inquire, whether that peculiar activity displayed by substances, when in their *nascent state*, may not be dependent on allotropism. It is known, for example, that nitrogen and oxygen may remain mixed together in their gaseous forms for any length of time without uniting; but let them be brought into contact at the moment that they are set free from any compound, and then they combine and produce nitric acid. A change of this kind is going on at all times in certain localities, and causing the formation of nitre—the only source of our aquafortis and saltpetre. Again, when a current of hydrogen gas is made to traverse a solution of arsenic or antimony, the elements show no sign of entering into combination; but if the experiment is performed in such a manner as to bring the metallic solutions into contact with the hydrogen at the moment it is liberated, then a union is effected, and we obtain the gaseous compounds of hydrogen and the metal. Such curious results as these can hardly be explained without supposing that the nascent elements are allotropically active, and that they lose this condition and become passive soon after their liberation from a compound.

Another question which presents itself is this. May not the several allotropic states of an element be transferred to its compounds, and thus be the cause of secondary forms of allotropism? We know that there are different varieties of phosphoric acid, of arsenious acid, of silicic acid; and of the oxides of tin, alumina, chromium, nickel, cobalt, iron, and tellurium; and why may not the different aspects of these substances be dependent on the allotropic states of their respective elements? Here, however, we approach a class of facts which have hitherto been regarded in an altogether different light; and it may be profitable to review them.

Long ago, the investigations of chemists taught them that the same elements may often be united in exactly the same proportions, and yet produce compounds of entirely different properties. This fact was first examined and generalized upon by Berzelius, and he gave it the name of *isomerism*. At first sight it appears to be distinguished from allotropism only in this—that the one has reference to the dissimilarity of property exhibited by an element, and the other, by that of a compound. As examples of the last, we may refer to the different varieties of carbonate of lime—aragonite and calc-spar; to the various forms of garnet; to the

green and blue carbonates of copper; to the black and red sulphurets of mercury and antimony; to the yellow and red varieties of iodide of mercury; to the inflammable and non-inflammable forms of phosphuretted hydrogen; and indeed to a number of other examples, which belong to the mineral kingdom. But it is among organic bodies that we find the most striking illustrations of isomerism. The non-nitrogenous compounds, for instance, present the following:—Butyral, and the aldehyde of buteric acid, although exceedingly different in properties, consist of the same elements in the same proportions—namely, $C_8H_8O_2$; formic ether, aceto-methylic ether, and metacetonic acid, consist, in each case, of $C_6H_6O_4$; valerianic ether, aceto-amylic ether, cupro-methylic ether, and œnanthelic acid, are severally composed of $C_{14}H_{14}O_4$; and we might, were it necessary, multiply such examples, by citing the isomeric conditions of the other fatty acids and fatty ethers. Again, it is a singular fact, that there is a large number of the volatile oils which consist of carbon and hydrogen united in the same proportion—viz., in the proportion of five of the former to four of the latter; and yet the physical and chemical properties of these liquids are most dissimilar. This is the case with the oils of lemon, citron, laurel, bergamot, turpentine, juniper, elemi, copaiva, pepper, cloves, cumin, parsley, wormwood, ginger, coriander, &c. And again, the substrata of vegetables—namely, sugar, starch, gum, dextrine, and cellulose, are also identical in chemical composition, notwithstanding that their properties are very different; and it is a curious fact, that each of the organic principles peculiar to animals, as albumen, fibrin, gelatine, and casein, has the power of assuming at least two forms—namely, the solid and liquid. Chemists and physiologists are now beginning to direct their attention to these singular properties, and are endeavouring to ascertain the circumstances under which they are manifested. Dr. Parkes, M. Melsens, and M. Panum, have each noticed that albumen may or may not be precipitated from its solutions by means of an acid and a neutral salt; and the first-named physician has ascertained that the albumen contained in the serum of the blood is usually in that condition in which it is most easily precipitated by an acid and chloride of sodium; but he states that it very readily passes out of this condition under the continued influence of acids and alkalies, and he hazards a conjecture, that these singular properties may perhaps have something to do with the processes of nutrition and absorption. Dr. Draper is of opinion that the effete particles of tissues are prone to seize oxygen from the blood, by reason of their being in an active allotropic state. We are accustomed, he says, to refer all such phenomena to the influence of the vital force; but what do we know of this power? Shall we be contented with the use of such an empty phrase, or shall we push our investigations further, in the hope of arriving at a satisfactory explanation?—

"The three leading neutral, nitrogenized bodies, fibrin, albumen, and casein, are characterized by exhibiting allotropism in a most marked degree, and that in a double sense: for, 1st, though so different from one another in their physical and chemical relations, it is admitted on all hands that they must be convertible. The albumen of the egg during incubation gives rise to fibrin and other allied bodies. From casein in the milk, with which the young mammal is nourished, the albumen and fibrin of its system arise; and the nurse, fed on fibrine and albumen, secretes

casein from the mammary gland. Indeed, there is no more reason to regard these three bodies as essentially distinct substances, than there is to apply the same conclusion to charcoal, plumbago, and diamond. And, 2ndly, each of these three compounds betrays a disposition, under trivial circumstances, to assume new forms—namely, a soluble and an insoluble."

In the inorganic kingdom it is found that the imponderable agents—namely, light, heat, and electricity—are the agents which bring about these changes; and, says Dr. Draper, "I infer that the nervous system has the power of throwing organized atoms into the active and passive state. That this is the fundamental fact on which all the laws of interstitial death depend; and upon this principle—namely, its existing allotropic condition—an organized molecule either submits to the oxydizing influence of arterial blood, or successfully resists that action."

Certain pathological states may also be explained by reference to these views:—

"In inflammation there has been that allotropic change in the soft solids involved, that they have assumed a disposition for rapid oxydation—they are active; their relation with arterial blood has become exalted, and the blood flows to the affected part with energy: redness of the part, and a higher temperature are the result. Oxydation goes on with promptness; and urea and sulphuric acid begin to accumulate in the urine. But in congestion it is the reverse: the parts are then thrown into a more passive state; oxydation goes on reluctantly; the amount of tissue metamorphosed diminishes; and the quantity of urea and sulphuric acid in the urine is lessened."

These opinions are, perhaps, a little in advance of the present facts of the case; but they indicate in a very forcible manner the tendency of the speculations which are just beginning to arise out of this curious condition of things; and we cannot but remark that, while on one hand they urge the physiologist forward into new tracts of inquiry, which promise much for the future; on the other, they carry the chemist back into old paths of investigation that have long been deserted. In fact, he is unconsciously brought into trains of thought and action which bear considerable resemblance to the doctrines of alchemy; and often does he ask these questions:—

"In what does chemical identity consist? In what will these wonderful developments of allotropism end? Whether the so-called elements may not be, after all, mere allotropic conditions of fewer universal essences? Whether, to renew the speculations of the alchemists, the metals may not be so many mutations of each other, by the power of science mutually convertible? There was a time when this fundamental doctrine of the alchemists was opposed to known analogies; *it is now no longer opposed to them, but only some stages beyond their present development.*" (p. 105.)

Davy, the illustrious predecessor of Faraday, was not indisposed to entertain a similar opinion; for, at the end of his chapter on the analogies between the undecompounded substances, he says:

"There is no impossibility in the supposition that the same ponderable matter, in different electrical states, or in different arrangements, may constitute substances chemically different;" and he goes on to remark that "even if it should be ultimately found that oxygen and hydrogen are the same matter in different states of electricity, or that two or three elements in different proportions constitute all bodies, the great doctrines of chemistry, the theory of definite proportions, and the specific attractions of bodies, must remain immutable; the causes

of the differences of form of the bodies supposed to be elementary, if such a step were made, must be ascertained; and the only change in the science would be, that those substances now considered as primary elements must be considered as secondary; but the numbers representing them would be the same, and they would probably be all found to be produced by the additions of multiples of some simple numbers or fractional parts."

The analogies which exist between many of the elementary bodies have also led Dumas into a train of speculations which have not yet assumed the consistence of a theory, and which, says Professor Faraday, are only at the present time to be ranged amongst the poetic day-dreams of a philosopher:—to be regarded as some of the poetic illuminations of the mental horizon, which possibly may be the harbinger of a new law.

"Regarding chlorine, bromine, and iodine as one triad, it will be seen, as we have observed, that between the first and the last there is recognisable a well-marked progression of properties. Thus, chlorine is a gas under ordinary temperatures and pressures; bromine, a fluid; iodine, a solid; in this manner displaying a progression in the difference of cohesive force. Again, chlorine is yellow, bromine red, iodine black, or, in vapour, a reddish violet. Here we have a chromatic progression;—and, strange to say, if we refer to the atomic or equivalent weights of the three, a numerical progression will also be observable. Thus, the atomic weight of chlorine is 35, of bromine 80, and of iodine 125. And now, if the atomic weights of chlorine and iodine be added together, and divided by 2, the result will be the atomic number for bromine." (p. 159.)

Similar triads exist in the case of potassium, sodium, and lithium; calcium, strontium, and barium; and sulphur, selenium, and tellurium: in each of which set of substances there is a similar progression in property and equivalent weight; for the sum of the atomic weights of potassium and lithium, divided by two, give the equivalent of sodium; those of calcium and barium give that of strontium; and those of sulphur and tellurium produce the combining proportion of selenium. So that, if it were possible to effect the combination of half an atom of each of the extreme elements in these series, the intermediate one would, perhaps, be the product, and an elementary body, as it is now called, might be produced.

Lastly, we may refer to the facts of *isomorphism*, as having a tendency to support the same general conclusions which flow from the study of allotropism and isomerism. Here we find that elements of the most dissimilar character may be made to displace each other, and to perform identically the same functions. In the various alums for example, we notice that iron, alumina, chromium, and manganese, may be used indifferently without affecting the form or chemical property of the crystal. The same is true of selenium, sulphur, manganese, and chromium, in their acid combinations; and of magnesium, zinc, and cadmium, in their basic relations. The application of this fact to mineralogy has already been very extensive; for it has been the means of accounting for the great variety of minerals in which small proportions of the isomorphic elements have displaced each other. And now it is also beginning to be applied in physiology. The researches of Dr. Blake have led him to conclude that isomorphic bodies produce the same set of effects when introduced into the living animal economy. This he has shown to be the case with the salts of magnesia and lime; of manganese, cobalt, iron, and nickel; of those of zinc and cadmium; of bismuth and lead; of soda and silver; of

potash and ammonia; and of palladium, platinum, osmium, and iridium. The same is also true of the acids of phosphorus and arsenic; of the salts of bromine, chlorine, and iodine; and of those of selenium and sulphur. And it is a singular circumstance that those bodies which have their homologues in the blood are not poisonous, while those which have not such a relationship are: thus it is that arsenic acid is not pernicious, because it is allied to phosphoric acid; while arsenious and phosphorous acids are extremely dangerous. Oxide of silver also may replace soda, although the oxides of other metals are for the most part injurious.

To review, therefore, the facts which have recently been developed, we find that there are four classes of phenomena which have a tendency to favour the belief that the elements may yet be decomposed, and, perhaps, in some cases, transmuted into each other. These are, 1st, the facts of *allotropism*, which show that the same elements may assume different aspects; 2ndly, those of *isomerism*, which prove that compound substances, having identically the same composition, may yet be endowed with different properties; 3rdly, the peculiar relationship observed between certain groups of elements, as in *the triads of Dumas;* and 4thly, the facts of *isomorphism*, which indicate the power which one element has of performing the function of another.

In alluding to the first and third of these, Professor Faraday remarks that,

"We have here one of the many scientific developments of late origin, which tend to lead us back into speculations analogous to those of the alchemists. Already have we seen that it is possible for one body to assume, without combination, two distinct phases of manifestation; therefore, such of the so-called elements as are subject to allotropism, are not the unchanging entities they were once assumed to be; and now we find, after our attention has been led in the direction, that the triad of chlorine, bromine, and iodine, not only offer a well-marked progression of chemical manifestations, but that the same progression is accordant with the numeral exponents of their combining weights. We seem here to have the dawning of a new light, indicative of the mutual convertibility of certain groups of elements, although under conditions which are as yet hidden from our scrutiny." (p. 159.)

But who knows how soon the knowledge of these conditions may be brought to light? and then what a field will be thrown open for new investigation. Professor Faraday is of opinion that, in pursuing this train of inquiry, much useful information as to the intimate nature of the elements would be derived from the liquefaction or solidification of hydrogen or nitrogen.

"Hydrogen, in many of its relations, acts as though it were a metal; could it be obtained in a liquid or solid condition, the doubt might be settled. This great problem, however, has yet to be solved; nor should we look with hopelessness on this solution, when we reflect with wonder, and, as I do, almost with fear and trembling, on the powers of investigating the hidden qualities of these elements—of questioning them, making them disclose their secrets, and tell their tales—given by the Almighty to man!" (p. 293.)

May the gifted teacher whose labours we have just reviewed, and whose contributions towards the solution of this grand problem have been so great, may he be spared to realize the truth of all the wonderful speculations which are here advanced!

H. Letheby.

Review VII.

Ueber Luft im Blute, in Pathologischen Beziehung. Von Dr. G. Cless.—*Stuttgardt,* 1854. pp. 72.

On Air in the Blood, in a Pathological Sense. By Dr. Cless.

Dr. Cless's attention was directed to the subject of the formation of gas in the blood, causing sudden death, by the following case:

A woman, twenty-one years of age, was admitted into the Katherine Hospital at Stuttgardt on the 29th of July, 1851, with symptoms of a "gastric fever," of medium intensity, and with some catarrhal affection. At the commencement of the second week the cough was well, the fever trifling, and with a tendency to an intermittent type. Sulphate of quinine was ordered. Three days later, on the 10th of August, the patient was suddenly seized with a convulsive affection, without perfect loss of consciousness; the convulsion lasted about fifteen minutes, and was followed by shivering, heat, and sweating. About an hour afterwards there was bilious vomiting, and a lumbricus was thrown up. The next three days and nights she was tranquil. On the morning of the 12th of August, when visited by the physician, she expressed herself as feeling comfortable; she had eaten her breakfast with some appetite; she was rather giddy when she went to stool, but otherwise had no head-symptoms; the tongue was cleaner than the day before; the respiration was perfectly easy; the face was a little flushed; the pulse quick (100), full, and weak. A quarter of an hour later the physician was sent for by the nurse: on his arrival the patient was dead. It appears that the adjoining patients saw her suddenly move in the bed, then become convulsed (apparently like opisthotonos), gasp for breath, sigh, and sink down in bed: all this occurred in about two minutes; she was seen the moment after, but was without sign of life.

The body was opened thirty hours after death, in very hot weather. There was no sign of commencing putrefaction. The brain was quite normal; there was no air in the vessels of the pia mater; there was no fluid in the pleuræ; the lungs were emphysematous, with some lobular collapse; there was no trace of decomposition. In the pericardium there was a little serum. When the heart was laid bare, a remarkable globular distension and bulging of the right auricle and ventricle was observed; when the operator rather hastily cut into the ventricle, to all appearance a gas issued out, with a hissing noise, as in pneumothorax, and the ventricle collapsed. The ventricle and auricle being fully opened, was found to contain a moderate quantity of coagulated blood in which were no air-bubbles; the endocardium was stained deeply red. The left ventricle showed no distension with gas like the right side, but there were some little bubbles of gas in the partly coagulated blood. The [illegible] was healthy; in none of the vessels was there any appearance of air. A little frothy blood exuded from the liver on section, but the blood from the other organs was not frothy. The spleen was enlarged and soft. In the ilium there were numerous nodules from infiltration of the solitary glands; Peyer's patches were not much infiltrated, but were

rather swollen, and had many dark points. There were many lumbrici in the intestines; the mesenteric glands were generally normal; three or four, corresponding to the lower part of the ilium, were swollen, and had a dark colour. Kidneys, uterus, and ovaries, were normal.

Dr. Cless believes the case to have been one of mild typhus abdominalis (typhoid fever). He remarks that sudden death, with apparently slight symptoms, is not excessively uncommon in this disease, and after death nothing may be found except the usual indications of typhus abdominalis. But in more than 1200 examinations of bodies, in various diseases, he never saw such a collection of air in the heart. This air could scarcely be a product of decomposition, as there was no evidence of such taking place in any other part of the body, and as local decomposition in the heart alone is a thing unknown in the records of post-mortem examinations.

A year after this case, a second exactly similar one occurred in the same hospital:

A girl, fourteen years of age, was admitted on the 16th July, with typhus abdominalis (typhoid fever); the bronchitic complication was severe. Seventeen days after her admission she appeared extremely well; when visited on the morning of the 2nd of August, she was found to have slept well, and to have no trace of breathlessness or other noticeable symptom. At 7 A.M. she coughed a little, as usual, and put out her hand to take the spitting cup; suddenly, she breathed with great difficulty, became livid in the face, stretched out her arms and fingers spasmodically, and fell back dead. All this did not occupy more than from one to two minutes. On section, twenty-six hours after death, in moderately warm weather, there was no trace of decomposition. Besides the customary appearances of typhoid fever (infiltration of Peyer's patches, enlargement of the spleen), there was air in the large veins of the neck, in the right auricle and ventricle, and in the blood exuding from the liver; and the blood on the right side of the heart also contained air. In the veins of the pia mater there was also air, but Dr. Cless attaches no importance to this common phenomenon. The blood throughout the whole body was fluid.

Dr. Cless relates a third case, in a tuberculous subject, communicated to him by Dr. Hedinger. This appears, however, to have some doubtful points about it, and is omitted from consideration.

After narrating these cases, Dr. Cless refers to the literature of the subject. Starting from Wunderlich, who, in his Handbook, lately published, speaks with doubt of such an occurrence, and refers to Otto for further particulars, Dr. Cless has apparently traced all reported cases to their original sources, and has subjected them to a very critical analysis. Some of them, especially the earliest cases, are rendered doubtful by one or other circumstance; but after eliminating all these, Dr. Cless believes that 13 undoubted cases of sudden death from rapid development of gas in the heart, are upon record. He gives a table of these cases, which we subjoin:

	Name of observer and year in which observed.	Sex of patient.	Age.	Previous disease.	Kind of death.	Discovery of air in the vascular system.	Other post-mortem appearances.	Condition of blood in the body.
1	Bechlin (1691).	M.	...	... Pain in the chest and great dyspnœa.		.. Great distension of the entire heart with gas; most marked on the right side; gas in almost all the veins.	.. Tympanitis of the intestines.	
2	... Gratz (in Morgagni).	F.	...	.. Fainting, breathlessness, suffocation.		The entire heart greatly distended with gas; no blood in it.		
3	Ruysch (1737).	F.	...	....	... Sudden death	... Enormous distension of the heart with gas; very little blood in heart.		
4	... De Jaer and Nysten (1811).	M.	45	Periodic asthma.	... Death in an asthmatic attack.	... The right heart and the whole venous system distended with blood, and a great quantity of gas.	... All organs normal.	
5	Nasse (1821) ...	M.	...	Delirium tremens.	.. Sudden death in sleep, without convulsions or dyspnœa.	.. The right heart enormously distended with air; the left much less so; air in the larger veins above the heart.	... Collection of fluid in the ventricles of the brain.	... Fibrinous coagula.
6	Ollivier (1833).	...	Child.	Measles	. Sudden death, with screaming.	... The heart and vessels opening into it distended with air ...	... Emphysema of the walls of the heart; air under skin of body formed after death.	
7	Ollivier (1833).	M.	...	... No previous disease.	.. Sudden death	... Same as above	.. General emphysema occurred after death.	
8	Ollivier (1838).	F.	22	... Convalescence from fever.	.. Sudden death, with a scream of pain & fear.	... Distension of the right heart with gas; no gas in the left; frothy blood in the pulmonary arteries.	... Nothing abnormal.	... Black fluid blood.
9	... Herrich and Popp (1848).	M.	18	... Slight typhus: almost convalescent.	. Sudden death, with screaming, groaning, and convulsions.	. Many air bubbles in the blood of the right auricle and in the cardiac veins.	... Slight swelling of the intestinal glands.	... Fluid blood and fibrinous coagula.
10	... Adelmann (1851).	M.	50	Carbuncle	... Death after cramps and rattling breathing for one hour.	... Gas in both jugular veins and in the heart	.. Fluid in the ventricles of the brain.	... Large coagula.
11	... Durand-Fardel (1851).	F.	56	... Habitual breathlessness; otherwise healthy.	.. Sudden death, after previous oppression.	. Gas in the blood of the median veins of the arm at the moment of death (V.S.) gas in the right heart and in the abdominal veins.	.. Hypertrophy of the left ventricle of the heart.	... Fluid blood everywhere.
12	Cless (1851) ...	F.	21	... Early stage of mild typhus (typhoid).	... Sudden death, with breathlessness and convulsions.	Distension of the right heart with gas; small air bubbles in blood of left ventricle; frothy blood in hepatic veins.	.. Intestinal catarrh, with infiltration of the glands.	. Dark and fibrinous clots.
13	Cless (1852) ...	F.	14	... Convalescent typhus (typhoid).	.. Sudden death, with breathlessness and cramps.	Gas in the jugular veins and in the right heart; frothy blood in the hepatic veins.	.. Infiltration of the intestinal glands.	... Fluid blood everywhere.

Dr. Cless then discusses the following points:—

1. In all these cases an accumulation of gas in the right heart, and in other parts of the vascular system, was noticed. Did this development occur after death, and is it to be considered as a product of decomposition?

As conclusive against this suggestion, he remarks, that in only one case (Nasse's) was there decided evidence of some amount of decomposition, and in the two other cases (Ollivier's), in which there was emphysema of the cellular tissue after death, the observer expressly states, that otherwise there was no trace of decomposition. Also Durand-Fardel's case, in which a vein was opened during life, and frothy blood issued, may be considered as conclusive that gas can form during life in the blood. Again, the fact that, in ten of these thirteen cases (and in other more doubtful cases not included in the table), there was sudden death, without sufficient lesion to account for it, unless the gas in the heart be supposed to have been formed before death, must be allowed to have considerable weight. In the other three cases, the duration of the incidents preceding death is not given in two (Pechlin and Gratz), and in the third case (Adelmann) the death was almost sudden—viz., it occurred after an hour of cramps and dyspnœa.

Again, another argument is drawn from the analogy of these cases with those in which air enters the veins during operations and experiments, and causes death by distension of the right heart.

All these arguments brought together, lead to the conclusion that the air present in the heart was really formed during life, and was the cause of the sudden death from mechanical impediment, and abolition by distension of the contractility of the right heart.

2. Admitting the foregoing conclusion, what may be the source and mode of origin of this gas?

Two hypotheses present themselves. Either it was atmospheric air entering from without, or it had been spontaneously formed from the blood. In all these thirteen cases there was no wound or point of entrance for the air, and it can hardly be supposed to have entered by absorption through unbroken mucous membranes. Moreover, as remarked by Dechambre, in his comments on Durand-Fardel's case, if no air be found in the arterial system, but only in the veins and in the right heart, it could not have entered the circulation through the pulmonary mucous membrane and the pulmonary veins. It would appear, then, certain that the gas was spontaneously developed in the blood. If so, where was it produced? In by far the greatest number of cases the venous system was the one affected. If we take Ollivier's loose expression, "*the vessels opening into the heart were distended with air,*" to refer to the veins only, as is most probable, then in no single case was the arterial system implicated, except that there was in some cases gas in the left ventricle. The venous blood, then, was the origin of the gas, and Dr. Cless thinks that it was developed in the peripheral part of the venous system, and brought to the heart. As to the mode of its formation, nothing at present is known.

3. As to the chemical nature, nothing definite can at present be said. Ollivier thought it was nitrogen, but this was an inference merely from Dr. John Davy's analysis of the gas found in a case of pneumo-thorax.

Dr. Cless devotes a page or two to the consideration of whether there may not be such a development of gas without fatal issue. No exact data exist for determining this point, but he directs attention to De Jaer's case, in which there were repeated attacks of spasmodic asthma. The man dying in one of these, gas was found in the right heart; were the previous attacks connected with a similar, but less development of gas?

As to the frequency of deaths from this cause, it is remarked that these thirteen cases are not the only ones discoverable in medical literature. Several others are imperfectly recorded—viz., Otto (two), Valsalva (one), Testa (two), Kerrick and Popp (two), and Morgagni (one). It would appear likely, in fact, that this kind of death is much more frequent than is supposed.

Dr. Cless alludes to a common post-mortem appearance, the presence of a little air in the veins of the pia mater. This need not detain us. We pass on to a brief statement of the development of gas in the blood from certain poisons.

(*a*) In *hydrophobia*, gas has been noted in the blood. (See Morgagni, Ploucquet,* Struthers.†)

(*b*) In poisoning by *strychnine*, gas has been noted twice in the blood; once in a man (Blumhardt), once in a dog (Griesinger).

(*c*) In a case of sudden death from *chloroform*, Dr. Major‡ found that gas was in considerable quantity in the blood, and *both* sides of the heart were distended with it. Death seemed to have been produced by this mechanical impediment. Berend§ records five such cases: and Dr. Cless thinks it likely that others are on record, but has not perused all the literature of deaths from chloroform.

Dr. Cless alludes to a late observation of Maissonneuve (September, 1853), who describes a form of gangrene in which rapid decomposition occurs, gases are formed in the interior of the veins, circulate with the blood, and lead to rapid death (*gangrène foudroyante*); and then finishes his interesting little treatise with a suggestion, that the name "Pneumathæmia" may be properly applied to the important disease to which he has now given a place in pathology.

Review VIII.

The Pathology and Treatment of Stricture of the Urethra, both in the male and female, being the Treatise for which the Jacksonian Prize for the year 1852 *was awarded by the College of Surgeons of England.* By Henry Thompson, F.R.C.S., M.B., Lond.—*London*, 1854.

It were vain to attempt to lay before our readers anything approaching a detailed and critical analysis of Mr. Thompson's very meritorious volume. Much of it is, of course, a compilation, and in noticing it we shall, therefore, restrict ourselves very much to those points in which the author has original investigations to offer.

* Initia Bibliothecæ Medico Practicæ, 1793, tom. i. p. 55. † Monthly Journal, 1851.
‡ Würt. Med. Corresp. Blatt, 1851, § 211. § Chloroform Casuistik, Hannover, 1850.

Length of the Male Urethra.—Mr. Thompson observes that different authorities give very different measurements of the length of the urethra, and that it, in point of fact, differs considerably in different adult individuals, and may also be made to vary greatly in the same subject, because of the extensibility of the parts. Mr. Thompson, therefore, in measuring the urethra followed a constant method, which is described, together with the results he obtained, in the following extracts:

"With a view to the solution of this question, I have pursued the following course with a considerable number of bodies. . . . . . The penis and bladder having been carefully removed from the pelvis, in the usual manner, the entire passage is laid open on the upper aspect. The parts are then placed, being first moderately extended, upon some smooth polished surface, as a common earthenware dish, and so permitted to take, by their own elasticity, any form or length which their component structures may determine. The measuring tape is then applied. The average result of the application of this process to 16 adult bodies is as follows:

"Total length, from anterior border of uvula vesicæ to meatus urinarius externus	$8\frac{1}{2}$	inches.
Dividing the canal in the usual manner into spongy, membranous, and prostatic portions, we have—		
Length of spongy portion	$6\frac{1}{2}$	,,
,, membranous ditto	$\frac{3}{4}$	,,
,, prostatic ditto	$1\frac{1}{4}$	,,
	$8\frac{1}{2}$	

"The greatest measurement was 9 inches, the smallest $7\frac{3}{4}$ inches. Of the 16, no less than 10 presented measurements which did not deviate more than a $\frac{1}{8}$ of an inch from the average, and ranging within $\frac{3}{8}$ of an inch only; that is to say, between $8\frac{1}{4}$ and $8\frac{5}{8}$ inches inclusive." (p. 3.)

Mr. Thompson goes on to say that inasmuch as the practical benefit of such researches relates to the use of instruments, it is more important to ascertain, if possible, the length of the urethra during life than after death. In investigating that point he followed the method adopted by Mr. Briggs, and fully satisfied himself of the correctness of that gentleman's statement that the average length of the adult male urethra is between $7\frac{1}{2}$ and $7\frac{3}{4}$ inches.

The Width of the Urethra.—On this point Mr. Thompson says:

"The mucous membrane, after death, when treated in the manner already described, is found lying in long, but minute and narrow folds, which are readily obliterated by stretching it in a transverse direction, when laid open, to about double its natural width. In this condition, but unstretched, we obtain measurements as follows; and these, it will be remembered, although denoting the circumference, represent about half what it really amounts to when the passage is ordinarily dilated:

The neck of the bladder, or commencement of the prostatic portion measured	$\frac{5}{10}$ to $\frac{6}{10}$	inch.
The centre of the prostatic portion	$\frac{5}{10}$	,,
Beginning of membranous, or end of prostatic portion. .	$\frac{5}{10}$ to $\frac{6}{10}$	,,
Middle of membranous portion	$\frac{6}{10}$	,,
End of ditto, close to the bulb	$\frac{5}{10}$	,,
Bulbous part of spongy portion	[illegible]	,,
The part within the glands	[illegible]	,,
Meatus externus	$\frac{5}{10}$	,,

"Thus it will appear that, relatively to each other, different parts of the canal bear certain constant proportions. For example, the external meatus itself is the smallest, except when, as very rarely happens, a congenital contraction exists about a quarter or half an inch from the extremity, and of course within view. Next is the point of function between the membranous portion and the bulb; while the centre of the prostatic portion, and the sinews of the bulb, are the largest." (pp. 5, 6.)

Mr. Thompson does not appear to have himself investigated the average extensibility of the urethra, and he adopts the measurements long since given respecting that point by Sir E. Home. As regards the practical utility of these inquiries he observes:

"The value of these researches is found in the practical application of the principles which result from them, to the employment of instruments in the urethra during life. Granted that constant relations of size between the different parts of the canal exist, and that the external meatus is known to be, with very few exceptions, the smallest of all, it follows, that an instrument which fills the orifice, without overstretching it, must be able to pass through its whole course unless some obstruction be present. Thus, to some extent, it may be regarded as a key to the capacity of the rest of the canal. As regards the actual average of measurements met with in practice, it is seldom that No. 12 cannot be fairly introduced into the adult urethra, while Nos. 13 or 15 are often admissible. The diameters of these instruments are, respectively, three-tenths and three-and-a-half tenths of an inch." (p. 8.)

Let us pass on now to another section of the work.

Locality of Stricture.—The following extracts from the chapter on the Classification and Pathology of Stricture of the Urethra give the results of Mr. Thompson's investigations on the comparative frequency of stricture in different portions of the canal:

"My own examination has included a very large number of cases. Ample proof of the extent to which these researches have been carried will be found in the examples cited in the appendix, and in the references there made to almost every public museum in the metropolis; to those in the museum of the Royal College of Surgeons, Edinburgh, which comprises Sir Charles Bell's collection, as well as to the very few in the Musée Dupuytren of Paris, which nevertheless contains all the examples preserved in that city. . . . . . .

"It has been already shown that the only method of conveying a correct idea respecting locality is to identify the contraction with the anatomical regions of the urethra, and not to trust to measurements from the orifice simply. This principle has, therefore, been adopted as the basis of the classification of strictures, in respect of situation, which is offered here. . . . . In examining the museums named, I have personally submitted to a close and careful inspection not less than three hundred preparations of stricture of the urethra. . . . . These examples may all be comprehended by the three following classes.

"I. *Strictures occurring at the Sub-pubic Curvature*—i.e., at the junction between the spongy and membranous portions and its neighbourhood; the latter term being understood to comprise an inch of the canal before, and three-quarters of an inch behind that point, thus including the whole of the membranous portion.

"The junction itself is the point at which stricture is most frequently situated. Next is the extreme anterior boundary of the division, a spot which is one inch in front of the preceding, and almost as frequently affected; while, between these two points, six examples of stricture are met with for every one behind the junction, in which latter situation, therefore, they are very uncommon. Most rarely is a stricture found so far back as the posterior part of the membranous portion.

"II. *Strictures occupying the centre of the Spongy portion*—i.e., a region extend-

ing from the anterior limit of the preceding, to within two inches and a half of the external meatus . . . . .

"III. *Strictures occurring at the External Orifice, and within a distance of two inches and a half of it.*

"The following is an analysis of the 270 preparations referred to; they exhibit 320 distinct strictures:—

Total number of strictures 320.

„ in Region	I. . .	215	or 67 per cent. on the entire number.	
„ „	II. . .	51	„ 16 „ „	
„ „	III. . .	54	„ 17 „ „	
		320		

"Of these—

There were 185 examples of *one stricture only*, situated in Region I.
„ 17 „ „ „ Region II.
„ 24 „ „ „ Region III.

There were 8 cases in which the urethra was strictured in all three Regions.
„ 10 „ „ „ in Region I. & II. only.
„ 10 „ „ „ in Region I. & III. only.
„ 18 „ „ „ in Region II. & III. only.

"Lastly, I may confidently assert that there is not a single case of stricture in the prostatic portion of the urethra to be found in any one of the public museums of London, Edinburgh, or Paris . . . . . at present . . . . . the existence of prostatic stricture appears to rest on the observations of Leroy d'Etiolles and Ricord. Its excessive rarity, to say the least, is at all events demonstrated." (pp. 85—89.)

Causes of Stricture.—With the object of determining "the respective influence possessed in the production of stricture by its various causes, as indicated by their proportionate numerical relation," (p. 108,) Mr. Thompson collected and analyzed 220 cases of stricture of the urethra, 143 of which are taken from the case-books of University College Hospital, and 49 others are selected from reports in journals. The remaining 28 came under Mr. Thompson's own observation. A tabular view of these cases is given in the appendix, and the following analysis shows the result deduced from them as to the relative frequency of the several causes of stricture:

ANALYSIS OF 220 CASES OF STRICTURE.

Antecedents, or supposed Causes of Organic and Permanent Stricture.

Gonorrhœal inflammation in	164
Injury to perinæum	28
Cicatrization of chancres	3
Ditto, following phagedæna	1
Congenital, including cases in which the urethra may have been small from malformation, and those in which marked irritability of the urinary organs existed from childhood, accompanied by an unusually small stream . .	6
Poisoning by nitrate of potash, lithotrity, masturbation, of each *one* (Lallemand)	3
True inflammatory stricture, including temporary stricture and retention from a sudden acute inflammation, usually caused by some excess, and disappearing by resolution	8
True spasmodic stricture, caused by irritation about the rectum	2
„ „ no cause assignable	2
„ „ caused by undue acidity and alkalinity of urine .	3
	220

"Respecting the first class of cases the following facts are elicited:—

Of the 164 cases attributable to gonorrhœa,

In 90 the disease is reported to have been *chronic or neglected.*
In 3 it was attributed to strong injections.
In 6 the discharge is stated to have ceased entirely and rapidly under treatment; but in 5 of these stricture appeared almost immediately after.
In 4 other cases the stricture appeared to be almost simultaneous with the gonorrhœa.

"In the remaining 61 there is no report of chronicity, &c.

Of the 164 cases attributable to gonorrhœa,

10 appeared immediately after or during the attack.
71 „ *within* 1 year of its occurrence.
41 „ *within* 3 or 4 years.
22 „ *within* 7 or 8 years.
20 are reported at periods between 8 and 20 to 25 years."

(pp. 132, 133.)

We would very willingly quote the account of Mr. Thompson's experiments to determine the action of nitrate of silver and of caustic potash upon mucous surfaces, but they would occupy too much space. We must, however, extract Mr. Thompson's conclusions respecting the employment of caustics in the treatment of strictures, with which we pretty nearly agree; excepting only to the admissibility of potassa fusa, perhaps at all, or at all events if so used as to "facilitate the *solution* of some of the component tissues" of stricture. Mr. Thompson's conclusions are as follows:

"That these agents are never to be employed for the sake of their escharotic or caustic powers, properly speaking.

"That the nitrate of silver, lightly applied, exerts a salutary action on the diseased surface of the urethra, relieving inordinate irritability, and checking undue vascularity and disposition to hæmorrhage, as it does in similar conditions of the skin and mucous membrane in other parts of the body, and thus it becomes a useful adjunct to dilatation.

"That the potassa fusa, as a caustic, is considerably more active than the preceding, and is therefore more dangerous of application. If used at all, it should be only in *very minute quantities*, such as a fractional part of a grain, inasmuch as it is exceedingly difficult to limit the action of so powerful an escharotic. It may, perhaps, aid dilatation in some strictures, probably by facilitating the solution of some of their component tissues, when care is taken to employ it in obedience to the condition thus named." (pp. 220, 221.)

Mr. Thompson examines the *questio vexata* of the external division of stricture, according to Mr. Symes' method, at much length, and with great ability, candour, and judgment. We can now only notice his attempt to determine the results of experience in relation to this operation, as set forth in the annexed extract:

"The operation of dividing a permeable stricture upon a grooved sound as a means of cure has been performed, so far as I have been able to learn, about 115 or 120 times. Through the kindness of those gentlemen whose names are given below, from each of whom I have recently received communications either in person or by writing, I have obtained the histories of many cases hitherto unpublished, and have collected more or less information, the results of which are annexed in general terms.

By Mr. Syme	70 times.	No death; a large proportion of the cases successful.
Mr. Fergusson . .		One death; two tolerably successful.
Mr. Cook		One death; the remainder more or less successful.
Mr. Coulson . . .		One death; the remainder more or less successful.
Mr. Erichsen . .		The majority more or less successful. One or two doubtful.
Mr. Haynes Walton		Successful.
Mr. H. Thompson .		Successful.
Mr. Mackenzie . .		One death; the remainder more or less successful.
Mr. Dunsmure . .		Two more or less successful. One unsuccessful.
Dr. F. Thompson .		Successful.
Dr. Cruickshank .		Successful.
Mr. Fiddes . . .		Five successful. One doubtful." (p. 257.)

Mr. Thompson, we are quite certain, turned the materials supplied to him to the best possible account; but he could not, of course, extract more information than they contained. The preceding table, it is obvious, gives no definite or precise information respecting the general results of the "Perineal Section," as it is commonly termed; and if any deduction were to be made from it, as it stands, it would certainly not be one very favourable to the operation.

In conclusion, it need only be said, that Mr. Thompson has produced a most judicious and excellent work; and any further eulogium were superfluous, as the volume possesses a substantial merit, which cannot fail to ensure it success.

Review IX.

1. *Untersuchungen uber Die Veränderungen im Körper der Neugeborenen durch Athmen und Lufteinblasen in Anatomischer und Forensischer Hinsicht.* Von Hofrath Dr. T. A. Elsässer in Stuttgart.—*Stuttgart,* 1853. pp. 111.

Investigations into the Changes produced in the Body of the New-born Child by Respiration and Artificial Inflation, in reference to their Anatomic and Forensic Relations. By Dr. T. A. Elsässer, Court Councillor in Stutgard.—*Stutgard,* 1853. pp. 111.

2. *Beiträge zu Pathologischen Anatomie der Neugeborenen.* Von Dr. F. Weber, a. o. Professor der Pathol. Anatomie in Kiel. Zweite Lieferung. *Brust und Hals.—Kiel,* 1852. pp. 85.

Contributions to the Pathological Anatomy of New-born Children. By Dr. F. Weber, Extraordinary Professor of Pathological Anatomy in Kiel. Part II. *Chest and Neck.—Kiel,* 1852. pp. 85.

3. *Journal für Kinderkrankheiten.* Herausgegeben von Drn. Behrend und Hildebrand. Band xxii., Heft 1 und 2.—*Erlangen,* 1854. pp. 134.

Journal for the Diseases of Children. Edited by Drs. Behrend and Hildebrand. Vol. xxii. Parts 1 and 2.—1854.

It appearing to the author of the treatise first upon our list, that the experiments of Schmitt, Albert, Jennings, and others, have been unpro-

ductive of definite results, partly in consequence of their relatively too small a number, and partly from some of the experimenters not having proceeded to their tasks with unbiassed minds, he deemed it advisable to re-open the important medico-legal question, as to the effects produced by the artificial inflation of the lungs of the new-born child. So far, indeed, from the question being at all settled, some points of great consequence—e.g., as the amount of inflatibility possible, and the *variability* of the phenomena recorded as produced by, or attendant upon, its performance, are, from the contradictory results of some of the experiments, difficult to offer the least explanation of. Under these circumstances it cannot be thought Dr. Elsässer has undertaken a superfluous duty, bringing, as he does, to bear upon his subject a series of investigations extending over a period of no less than twenty years.

"The results of these investigations, which extend not only to the changes experienced by the lungs, but to those of other important organs, have been compared and reduced for the present work by Dr. J. Reuss, with a thoroughness and lucidity which a high interest in, and full knowledge of, the difficult and important subject could alone effect. The experiments themselves have received great additional value from the ample inquiries into the lungs which Professor Köstlin had the kindness to institute, and the results of which are here communicated in pages 103 to 111." (p. iv.)

The chief materials upon which are based Dr. Elsässer's conclusions may be said to consist of observations made upon eighty-six still-born, or apparently still-born children, whom no artificial attempts at resuscitation could animate. The investigation was carried on at the St. Catherine Lying-in Hospital of Stutgard, between the years 1831 and 1852. Of these eighty-six children, fifty-five were boys, thirty-one girls; in thirty-seven cases the labour was natural, and in forty-nine recourse was had to manual interference. The artificial inflation was practised in various methods as regards details, though still reducible to the two chief ways—viz., inflation through the mouth, and by the nostrils of the child.

"In thirteen cases the inflation was void of results, in seventy-three with results. Thirty-four times these results were complete—i.e., attended by entire inflation of both lungs; whilst thirty-nine times they were incomplete—i.e., followed by partial fœtal condition of one or both lungs. But though in not quite one-sixth of these cases, simple inflation was unproductive of consequences; on the other hand, the lungs were nearly as often perfectly, as they were imperfectly, expanded: by which fact the doubts expressed by several writers (Röderer, Albert, &c.) as to the possibility of inflating the pulmonary organs are completely quieted." (p. i.)

Of the seven sections into which the work before us is divided, six are taken up with the consideration of the following subjects—viz., general statistics, relations and conditions of the organs before inflation, appearances during inflation, anatomic condition of other organs than the lungs, the hindrances to inflation, and a "critic" of the different modes of its performance. The consideration of these topics carries the reader to the 66t[illegible]e. The seventh section follows, and discusses the various differ-[illegible]served in the results of artificial inflation, and the consequences [illegible]ural respiration. Upon the whole of these subjects the reader will [illegible]minute and valuable information, which would (did the space at our [illegible]osal permit) offer ample opportunity for some extended analysis, if

not of criticism. As it is, we must content ourselves with recording the deductions Dr. Elsässer has arrived at, and show the reader presently wherein the author finds it necessary to differ from some views lately promulgated by Professor Weber, of Kiel.

"The legitimate consequences of our inquiries, as have now been detailed, must be expressed as follows:—from the *anatomic investigation* of a new-born child (if the same died *soon* after birth) it can be *by no means affirmed with apodictic certainty* whether such child has respired, or whether air has been artificially inflated; but, on the other hand, in many cases a greater or less degree of *probability* may be attained to for the belief of one or the other circumstance. This conclusion may appear somewhat unsatisfactory, but it is certainly preferable to a delusive surety, which in no department of knowledge may entail such immediately melancholy consequences, as in that of forensic medicine." (p. 111.)

In our tenth volume we took the opportunity of noticing Dr. Weber's exertions in the cause of pædiatrics, and we are again happy in announcing the publication of the second part of his treatise on the pathologic anatomy of that transition period intervening between the latter portion of intra-uterine and the first period of extra-uterine life. The former part of his work, it may be recollected, referred to the "head and spine;" the present embraces the pathological anatomy of the "chest and neck." In it we have discussed diseases of the pleura, of the lungs, of the thymus gland, of the heart, and of the thyroid body; besides several correlated topics of interest. The *pleuritis* of new-born children is considered under a twofold aspect—viz., "pure inflammatory pleuritis," and "pleuritis from dyscrasia" The latter implies such cases of the disease as appear to be associated with puerperal fever in the mother. Upon the intimate connexion of this malady with infantile pleuritis, and with the death of the child soon after, or even before birth, the author has several interesting remarks (p. 29), though some will consider his views rather hypothetical. When treating of the morbid states of the lungs, the particular subject which has so closely engaged Dr. Elsässer's attention receives some detailed consideration from Professor Weber, and the following quotation from the latter should be compared with the views adopted by the former.

"It is scarcely necessary to mention that the effects of artificial inflation may complicate the phenomena observed in the lungs of children of deficient respiratory power. Nor will I deny that the lungs of such children may be met with presenting appearances analogous to those proper to inflation. Nevertheless the rule is, that the matter exists as I have above described it. I, therefore, cannot entirely coincide with those who maintain that there are decidedly no diagnostic marks of difference between a lung expanded by artificial inflation and one distended by imperfect respiration." (p. 32.)

Dr. Weber next discusses the subject of *Atelectasis*, but instead of offering any comments of our own we shall lay before the reader some criticisms of Elsässer upon the opinions of our author.

"Weber has recently (Beiträge zu Patholog. Anatomie des Neugeborenen) sought to lay down as the marks of distinction between lungs that have imperfectly respired and lungs artificially inflated, that in the former all the pulmonic vesicles contain air, but yet incompletely so, whilst in the latter portions of the organs are in quite a fœtal condition, and portions completely inflated or even emphysematous. In the first instance, the atelectasis would consequently be vesicular; in the second,

case, lobular or lobar. In vesicular atelectasis the smallest incised pieces swim, though imperfectly; in the lobular variety one piece will sink, another float completely. Now, to test these views I have compared the conditions of the atelectasic lungs of 30 individuals who had lived for a longer or shorter period, and whose respiratory organs in other respects were quite healthy. Amongst them I found the atelectasis vesicular exactly as described by Weber once only in a child dying in the fourth week. These (and most other) observations upon which the comparison has been based were made in 1849-50, and long before the appearance of Dr. Weber's publication. If, consequently, we are decidedly opposed to his views on the matter, we may with equal justice repudiate the double suspicion either that the observation of another has been necessary to draw our attention to this point, or that we have judged the facts falsely from previous prejudice." (Elsässer, op. cit. p. 83.)

The series of morbid changes constituting the so-termed "infantile pneumonia," the exact nature of which has been so much litigated, represents one of the most frequent and lethal affections of the first weeks and months of life. Of this every one's practice affords melancholy proof; but what, according to Dr. Weber, has not hitherto been so generally admitted, is that this malady is one from which the child is not entirely exempt pending intra-uterine existence even in its earlier periods. When, during the fœtal state, a small portion of the lung is engaged, great danger is threatened to extra-uterine vitality; but when a large part is involved, the latter is almost impossible. The author affirms that children attacked by intra-uterine pneumonia rarely live longer than a few days, sometimes only a few hours. As the subject of pneumonia in the child has been frequently and fully discussed in our pages, we shall at present content ourselves with quoting the following remarks of Dr. Weber:

"Before leaving this affection and its consequences as they occur in children at the breast, I shall allude to another complication hitherto little noticed by practitioners and pathologic anatomists, but which nevertheless deserves close attention during life, as it not rarely brings about the fatal event, and may sometimes be removed by appropriate treatment. I refer to the supervention of the exudative process within the sac of the spinal arachnoid during the advanced stages of the pneumonia of infants. Much better known than this is the complication of hydrocephalus with the pulmonic disorder, a complication frequently witnessed by every busy practitioner. . . . . The symptoms are as follows: the child, otherwise quite conscious, begins to draw the head down upon the chest, and if the former be attempted to be moved, the neck is found to be as in trismus, stiff and unyielding. The forearms strike the bed-coverlets involuntarily or automatically. If the mischief increases, the jaw is sometimes tensely drawn down, the child appears seized with terror when moved, and finally dies in a state more or less developed of tetanic spasm, though in a condition of perfect or but partially disordered consciousness. I saw several children die in this manner in whom the pneumonia was pretty extensive." (p. 61.)

Necroscopic details are given illustrative of the above complication, and then Dr. Weber acquaints us with his present method of treating pulmonic inflammation, whether associated with it or not, a method advised by "a very experienced and thoroughly to be depended upon senior colleague, Dr. W. Nissen, of Altona." It consists in applying bandages or compresses wet with cold water to the thorax and between the scapulæ, and this "without further regard to the sometimes very great astonishment of the parents." (p. 63.)

The author affirms that "considerable hypertrophy" of the thymus gland may exist without necessarily inducing the symptoms which have been designated "*asthma thymicum*,"* and that diseases of the thyroid body are rare north of the Elbe. A very considerable portion of the "Clinical" and "Report" departments of the present number of the 'Journal for the Diseases of Children' is taken up with an account of such of the proceedings of the London Medical Societies and serials as have lately borne reference to the subject of pœdiatrics. To these we need not further allude. The more important of the other articles are those by Dr. Mauthner on the operation of *santonin* and its influence on the colour of the urine, and on the diuretic action of urea; by Dr. Emil Gesele on the cases treated during the last quarter of 1853 at the Hospital for Children at Munich; and a detailed analysis by Busch of the first portion of a new work by Dr. Berg, of Stockholm (Kliniska Förcläsningar i Barnsjukdomarne, &c.), containing such clinical lectures on the diseases of children as the respected author has published in the 'Hygiea' between 1847 and 1853. The present division of the work in question embraces some general observations on clinical medicine in connexion with children, a minute though practical retrospect of the literature of this department of medicine, and a detailed account in chronologic order of the history of pœdiatrics in Sweden.

W. Hughes Willshire.

Review X.

Practical Observations on Gout and its Complications, and on the Treatment of Joints stiffened by Gouty Deposits. By T. Spencer Wells, F.R.C.S. Eng, &c., late Assistant-Surgeon in Malta Hospital.

The special object of this work is stated in the preface to be, not the production of a systematic treatise on gout, but one containing new matter and facts, bearing especially upon the treatment of joints injured by gouty deposits, and more particularly on their treatment by means of small doses of iodide of potassium, a remedy which the author believes to possess peculiar and powerful effects in such affections. As this is the special point dwelt upon, the author considers that he is not encroaching upon the province of the physician in bringing out the present volume.

In criticising this work, we trust we shall not be considered as referring too often to our own labours, but having for many years been engaged in investigating the subjects of gout, rheumatism, and the allied affections, and having very recently made known many of these observations, which, however, are as yet unpublished, we have been obliged to allude to them more frequently than we should otherwise have desired. The book opens with a chapter containing a short account of the nutrition of the body, the manner in which the constant wear and tear of the tissues is renewed in health, and the requirements necessary in order that such a condition should be maintained, and by this means the reader is led to consider what must be the effects produced by deviations from these various requirements, and how various diseases, and amongst others the one under consideration, may thus be induced.

* See the review of Dr. Mauch's treatise in our last number, p. 81.

The condition of the blood in gout is next inquired into, and the observations of the reviewer with regard to the presence of uric or lithic acid in that fluid are given, and the confirmation of the facts by other observers. As we shall have to dilate a little on this subject, it will be convenient to quote the words of the author:—

"Dr. Garrod published a very important paper in 1848, in the 'Medico-Chirurgical Transactions,' in which he showed that the blood, in four cases of gout, contained lithic acid in the form of lithate of soda. He believes that in cases of chronic gout, with chalky deposits around the joints, lithic acid is always present in the blood, and deficient in the urine, both absolutely and relatively to the other organic matters."

Since the publication of the paper referred to, our attention has been constantly directed to the confirmation or refutation of the above statement, as to the essential presence of excess of uric acid in gouty blood; and we have been enabled to show it in morbid amounts in more than fifty cases, and have, at the same time, had no evidence of its ever having been absent, and hence are led to the conclusion that it is always in excess in such pathological condition of the system, and constitutes, therefore, a very important and almost pathognomonic sign of gouty disease; we say an *almost* pathognomonic sign, because we know that there are certain other morbid states of the system in which it is present, but these are not articular affections.

After speaking of the animal fluids, the subject of gouty concretions, or those deposits of chalk-like matter around joints, and in the other parts of the body, is treated of. It has been well made out, since the time of Wollaston, that they contain urate of soda, and many analyses of them have been published, all confirming the original statement, but differing considerably with regard to the amount of this substance, and the nature of the other principles with which it is united; this is more especially the case with regard to the phosphate of lime. Mr. Wells gives the following as the result of his experience on this subject:—

"Microscopic observation has convinced me that the composition of these concretions varies very much in different persons, and in the same person at different periods. When there is general plethora, or an inflammatory tendency, or when the system is supplied by active digestive organs, with superabundant nutriment, lithic acid, or the lithates at times abound in the urine, at others are deficient; and the lithates with albuminous matter compose the gouty concretions. When, on the other hand, the general health of a gouty person has been broken up by long continued suffering, by mental anxiety, or any other depressing cause; when the digestive organs cannot prepare nutritive matter of good quality, or in sufficient quantity, to supply the wants of the system,—then the body feeds upon itself; its own half-dead tissues are its food, the phosphates form in the urine, and are deposited around the joints."

We cannot exactly agree with the author on this point; very numerous observations, both microscopic and chemical, have convinced us that urate of soda forms essentially the matter of the gouty concretions, that it is first effused in a liquid state, but that immediately crystals of urate of soda form in it, giving the fluid an opalescent appearance; that after a time the fluid portion becomes absorbed, leaving a concretion, consisting of little more than bundles of crystals of urate of soda, united with the tissue in which the secretion may have occurred; that not unfrequently, after a

time, deposits of phosphate and carbonate of lime ensue in and around these semi-fluid concretions, and that then such matters must be regarded merely as the result of ordinary inflammation occurring round a foreign body, and equally liable to occur in patients without any gouty diathesis, such calcareous concretions being common in various glands and other organs of the body, and in patients of every diathesis.

We do not believe that in very low-conditioned, gouty subjects, phosphate of lime ever replaces urate of soda; we have often examined the progress of the formation of tophaceous concretions in patients brought down to the most deplorable condition by long-continued gout—patients, whose blood (as proved by analysis) had become greatly impoverished, but in whom the effusions, when liquid, were shown to consist as purely of urate of soda as when occurring in the most highly-conditioned persons.

Mr. Wells next examines the power of hereditary predisposition in inducing gout, and agrees with all other observers in acknowledging its great influence. He relates also an interesting case, showing that the children of a patient born prior to the development of gout were quite free from this affection in after life, whereas those born subsequent to that period became gouty.

Our author also appears to favour very highly the view of the close connexion between mental development and gout, even to the extent of asserting—

"That in all cases where there was no hereditary predisposition to gout, they (that is, the influences ordinarily considered as producing the disease) would only succeed in men endowed with a highly organized condition of the nervous system, even when they had fulfilled all the above conditions. Sydenham observed that gout killed 'more wise men than fools.' Cullen said that it affects especially 'men of large heads.' And, to come to one of the most careful observers of our own times, Dr. Watson refers to the fact, that gout is peculiarly incidental to men of cultivated minds and intellectual distinction."

He afterwards goes on to say, that

"Among the present members of the Houses of Parliament, those who are known to be subject to gout are among the most distinguished for an ancestry rendered illustrious by high thoughts and noble deeds, for their own keen intelligence, for the assistance they have afforded to improvements in arts, science, agriculture, and for the manner in which they have led the spirit of the age."

Of the very potent influence of hereditary predisposition in the production of gout we have not the slightest doubt; we have recently shown, in a paper read before the Medico-Chirurgical Society, that even among some of the labouring classes, it is felt to the amount of a very large percentage, and in the upper classes probably in a still greater proportion. We know a gouty gentleman who is able to trace the disease in his family for 400 years, and in which the eldest son has invariably inherited, along with the estates, gout of the worst form, and developed at an early age.

With regard, also, to the influence of mental development, we agree, to some considerable extent, with the author, but at the same time we have notes of cases, both in private and public practice, in which no hereditary tendency could be traced, although the patients were fully aware of all their family peculiarities, in which gout has occurred often early in life—that is, at about thirty years of age—and in whom the

disease could be distinctly traced to high or improper living, and indulgence in wine and malt liquors; some of these patients certainly were not "men endowed with a highly organized condition of the nervous system;" to ordinary observers some appeared rather the reverse, and to reconcile these cases to our author's hypothesis, we must regard them as not unlike some of the inmates of Stoke Pogis churchyard,—"Mute, inglorious Miltons," "whose lot forbade" the mental development which their gouty tendencies foretold.

The only point, however, in which our opinion on this subject really differs from that of Mr. Wells is, that we believe gout *may* sometimes have for its sole cause irregularity of diet; and to confirm our view, we have only to investigate this disease occurring amongst the men connected with breweries, wine cellars, and those engaged in similar occupations.

The influences exerted by the nature of the food, both solid and liquid, by climate and exercise, cleanliness, and so forth, are next considered; and the different views of Liebig, Lehmann, Magendie, and Bernard, with reference to the relation between uric acid and urea, discussed. We shall not at present enter into this subject.

Chapter II. is devoted to the investigation of gout as modified by rheumatism. Mr. Wells fully believes in the essential distinction between the two diseases, and considers that the presence of uric acid in the blood in gout, and not in rheumatism, constitutes at once a most important difference; this point we are now enabled to strengthen by an amount of evidence far beyond that which our author was in possession of at the time of the publication of his work; and so completely satisfactory is this evidence, that we have little hesitation in asserting that the presence or absence of this body in abnormal amounts forms, as we have before remarked, a pathognomonic sign in making a differential diagnosis between gout and rheumatism. With regard to the presence of lactic acid in rheumatic blood, although we by no means deny the occurrence, yet we should hesitate before we accept it as a fact until further evidence has been adduced. The other points which mark the distinction between the two diseases are next alluded to, viz., the occurrence of chalk-like deposits, the affection of the great toe and smaller joints, the frequent œdema of the inflamed parts in gout, and the liability to cardiac inflammation, the more common selection of the larger joints, and the rareness of œdema, &c., in rheumatism. Mr. Wells also alludes to the marked difference in the effects produced by colchicum in the two diseases, being, as he states, so marked and powerful in gout, but almost null in cases of unmixed rheumatism. In these observations our own experience entirely coincides; we believe that in acute rheumatism the curative influence of the drug is no greater than that of any other antiphlogistic remedy, a statement which no one who has seen much of the treatment of true gout would venture to make, with regard to its (we think almost magic) power over that disease.

Mr. Wells next considers the disease or diseases named rheumatic gout, and says:

"There are several classes of cases, however, in which the symptoms of rheumatism and gout may be simultaneously observed in the same person, constituting varieties of what is called rheumatic gout, a most indefinite term, embracing several distinct species of compound disease."

He then proceeds to describe them shortly under different heads; and, as we are desirous of bringing this subject particularly under the reader's notice, we will give his own description of one of the cases.

"A gentleman, about 40 years of age, descended from gouty parents, and accustomed to indulge rather freely in the pleasures of the table, about five years ago had a slight attack of gout under the ball of the right great toe. This soon went off, but at intervals of three or four months similar attacks had recurred, their severity and frequency both being on the increase. One evening he felt that an attack was threatening, but he attended late in the House of Commons, and as the pain was increasing, he thought a day's exercise would probably ward off the attack, as he had found it had done so before. Accordingly on leaving the house, he posted all night between seventy and eighty miles, to have a day with his hounds. He arrived but just in time to equip for the field, and had one or two short runs and a very long one, in the midst of rain, on a cold day. He had to ride fifteen miles on a tired horse on returning, and when he reached home had to be lifted from the saddle and carried to bed. He took hot brandy and water, but a severe rigor came on, and a general attack of acute rheumatism set in on the following day. It was so severe that the gouty inflammation of the foot was disregarded, attention being given to the state of the heart and general condition. In about a fortnight he was convalescent, as far as the rheumatism was concerned, but the gouty action continued in the foot, and did not disappear until a few doses of colchicum had been given."

Mr. Wells speaks of attention being paid to the heart, but as no mention is made of that organ being affected, we may presume it was not. Looking at all the circumstances of the above case, we should be inclined to consider it not as one of acute rheumatism, but of acute general gout, induced in a very gouty condition of the habit, by over-exertion or fatigue, accompanied possibly by cold.

Acute general gout often affects the larger joints as well as the smaller, and, except in its want of tendency to produce cardiac inflammation, is with some difficulty distinguished from acute rheumatism, provided that the condition of the blood is not taken into account. And again, acute general gout not unfrequently is induced by a sudden shock or great fatigue, as the following case occurring in our own practice well illustrates.

A man aged 36, a painter, was admitted at first into the surgical wards of University College Hospital, in the end of December, 1853, having received a severe blow from the shaft of a cart. Fracture of a rib had taken place and slight pleuritis; the next day the patient was in a highly febrile condition, and suffering from pain, swelling, heat, redness of many of the larger joints of the body, as the ankles, knees, wrists and hands, and some of the toes; the next day some of the small joints of the hands became affected, especially the middle articulation of the right index finger. At first this case had all the appearance of being one of acute rheumatism; the blood, however, on examination, was found to contain excess of uric acid. After a few days the true nature of the disease became evident, for on the subsidence of the inflammation, the finger joints remained swollen, and a bursa, when punctured, gave exit to a thin milky fluid, containing beautiful crystals of urate of soda; at a still later period, during convalescence, one or two small concretions of this salt appeared on the helix of the ear. This doubtless was a case of acute gout brought on by a sudden shock; one, however, but for the

examination of the blood and the subsequent (and in such cases by no means common) appearance of urate of soda deposits, which might have readily passed for acute rheumatism.

Although we would by no means deny the possibility of acute rheumatism occurring in a gouty habit, or of gout becoming engendered in a patient who has suffered from rheumatism, or is affected with this disease at the time, still we are fully of opinion that no such disease which can correctly be termed rheumatic gout exists; that, in fact, there is no such phenomena known as the merging of gout into rheumatism, or of rheumatism into gout; that the name is given as a cloak for ignorance of the true nature of the case, and that the same disease is not unfrequently termed gout by one, rheumatism by another, and rheumatic gout by a third practitioner. The difficulty of diagnosing many of these cases by the ordinary symptoms is exceedingly great, even when special attention has been paid to the subject; and, therefore, it is not a matter of surprise that the convenient name rheumatic gout has been invented.

Chapter III. is occupied with a discussion upon the laws of syphilis, and its effects in modifying other diseases,—amongst others, gout; but we cannot find that its modifying power upon the latter affection is greater than upon many others, and do not see how, from the data furnished in the work, any special rule can be laid down capable of guiding us in diagnosing these mixed cases.

Mr. Wells insists especially upon the use of small doses of the iodide of potassium in such complications, which remedy, he thinks, and most of the profession will agree with him, has a marked and speedy action on the syphilitic part of the disease, and a more slow yet efficacious influence upon the gouty portion. The bulk of this chapter, occupying about twenty-four pages, is devoted to the exposition of the author's views on syphilis, rather than to the consideration of gout.

In Chapter IV. is contained the "morbid anatomy of gout," and the description of the various latent forms of the disease. Interesting cases, showing the condition of the joints when attacked with acute gout—examples of which are not often met with—are given; one of these is detailed from the author's own observation; the many alterations induced by the chronic disease, accompanied with deposits, are carefully and accurately detailed. The irregular forms, depending upon deposits of saline and earthy matters upon the fibrous tissues of various parts of the body, and upon the efforts of nature to throw off gouty matter from the blood through the kidneys, are next described; but we must here remark, that all the cases do not appear to us clearly made out to be gouty in character, for deposits of calcareous matter, not containing uric acid, are no proof of the existence of the disease. Atheroma and gouty matter are not at all allied, and even in patients in whose bodies urate of soda deposits were common, atheromatous matter, taken from the aorta, has been found not to contain a trace of this principle: this we have ourselves observed. "Chalky tubercular masses may occur in the fissure of Selvius, and in the choroid plexus of gouty patients;" but it does not follow that they are the result of gout, for they undoubtedly as often occur in subjects quite free from this disease.

Chapter V. opens with the following remark, made by Sir Benjamin Brodie, in a letter to Dr. Gairdner:

"A large proportion of the persons that come to me with what are esteemed to be local diseases, are in reality suffering from the influence of the gouty poison in the system, though they have nothing which would commonly pass for gout."

Mr. Wells thinks this applies especially to the female sex. That many cases of what may be called masked gout exist—that a gouty condition of the habit not unfrequently gives rise to many symptoms not ordinarily regarded as gouty—there can be little doubt; but, at the same time, it is rather a dangerous idea to get into one's mind that such are frequent, for there is considerable temptation, when we cannot make out clearly the nature of a case, to say, it is of a gouty character: it often becomes an excuse for neglecting repeated examinations, and by this means errors, sometimes grave in character, may arise. It would be very desirable, in all suspected cases of this kind, to have a proof, and we cannot help thinking that an examination of the serum of the blood, or of a blister, by the mode we proposed in a paper read before the Medico-Chirurgical Society this year, would prove very useful for such purposes. Of course, the value of any knowledge thus gained would depend upon the amount of evidence which can be shown as to the constant existence of excess of uric acid in the blood of gouty patients; the method is simple and easily performed, without any chemical knowledge, and is capable of clinical application.

Many of the cases of so-called anomalous gout, given in this chapter, are, we think, somewhat open to criticism; they want the proof of their depending on a true gouty diathesis, for it appears to us that such has been too often assumed.

We must pass over Chapters VI. and VII. without much comment. In the first are given good rules as to diet, exercise, habits of life, climate, &c., which should be followed by gouty patients; they apply also to patients liable to suffer from many other diseases, and contain much that is sound and valuable, and cannot be too highly recommended. In the second (Chapter VII.) the value of the cold water cure is considered, and from personal experience of its effects, Mr. Wells thinks that, in acute cases of gout, it is dangerous, and examples illustrating its danger are given; but that in chronic cases, if properly followed, it is useful. He thinks that the medical profession have too much neglected the benefits of some of the methods followed by professed hydropathists, and that many of them might be advantageously followed out at the patient's own house, removed from the domain of quacks, and under the superintendence of the legitimate medical adviser.

With regard to the general medical treatment of gout, contained in Chapter VIII., we do not find very much to comment upon. Our author thinks bleeding injurious or unnecessary in any case, except, perhaps, where it may be of great importance to afford temporary relief immediately. We agree with him as to its being unnecessary in most cases, but we have often seen the most decided relief, of which the patients were themselves quite conscious, produced by the abstraction of small amounts of blood, and without any subsequent ill effect; we say small quantities, as we have hardly ever exceeded four fluid ounces at a time, and seldom repeated the operation. On this subject we think that we are entitled to speak with a little confidence, having within the last few

years had blood abstracted from more than fifty patients labouring under gout; in many of these, however, the quantities were very small, and the bleeding prescribed rather with a view of assisting our knowledge of the pathology of the affection, than to its therapeutic influence.

The value of purgatives, sudorifics, diuretics, are next discussed, but nothing advanced that calls for any particular comment. Next comes the often-asked question as to the value of colchicum in gout, and the mode in which it acts in giving relief. Mr. Wells fully recognises the value of the drug, given in moderate doses; in this we fully agree, believing, as we do, and as almost every gouty patient will testify, that it is the most powerful of all known medicines in giving relief and shortening the attack; nor do we think that, when administered properly, it produces subsequent prejudicial effects. Mr. Wells prefers the tincture of the flowers, a preparation, we believe, brought into notice in this country by Sir James Clark; if it is *really* more constant in its strength than the other preparations, this is a decided advantage, but we cannot clearly comprehend how, supposing the same active principle to exist in all parts of the plant, it can have any peculiar action over and above the officinal wine and tinctures; our own experience, however, of the flower tincture is far too limited to enable us to speak confidently upon its value. How does colchicum act? Mr. Wells thinks the question is now approaching a satisfactory conclusion; we wish we thought so likewise, but after very many and rather lengthened investigations of the subject, we are obliged to confess our utter ignorance as to its mode of action. Chelius once made a statement that in some cases it increases the amount of uric acid in the urine. Dr. Graves made a somewhat opposite assertion; for our own part, we do not know whether it decreases the uric acid in the urine or not, although we are pretty certain that it does not increase it; that Chelius's patient threw out a greater quantity of uric acid we do not for a moment doubt, taking his word for it, but that such increased excretion was due to the colchicum is very open to doubt, for the patient was just recovering from an attack of gout, and it is probable that without the medicine the effect would have been the same. Then again, the evidence as to the increase of the other nitrogenized principles, as urea, &c., and the conversion of one into the other, is by no means satisfactory; and for every analysis showing their increase under the remedy, we could give one indicating a decrease. In some so-called proofs, a small quantity of urine passed at one time by the patient only was examined, a method giving no imaginable evidence of the total quantities eliminated. There can be little doubt that up to the present time too much stress has been laid upon so-called chemical analyses, and very improper uses have been made of them; we trust that a new era is approaching, when clinical chemistry will rank as one of the most accurate and important means of pathological investigation.

In Chapter IX., the treatment of joints stiffened by gouty deposits is considered, and much stress is laid on the efficacy of constitutional means, and as an encouragement for perseverance, the author makes the following remarks:

"In adopting any plan of constitutional treatment, in order to contribute to the restoration of joints stiffened by gouty deposits, our hopes of success will be

strengthened by the recollection of the general law, that all the solid parts of the frame may be considered as precipitates from the blood, which are constantly being deposited, and as constantly dissolved or renewed. While the form of each part remains unaltered, the material particles composing it are so constantly being renewed, that the solid parts of the body must be regarded as almost as changeable as the blood itself."

He then proceeds to speak of the power of certain medicines in penetrating the different parts of the body, and especially refers to iodide of potassium, which, he says, has been detected in almost every animal solid and fluid, and from thence draws the deduction,

"That the hope of acting upon a salt deposited in some of the tissues of the body is not unfounded, for in the iodide of potassium we have a soluble substance which is rapidly absorbed with the blood, and may be detected in the tissues of the body, and in the excretions long after administration, proving that it can exert a persistent influence; and as this salt has the power of dissolving the lithate of soda, the material which is the principal cause of the stiffening of the joints, by being deposited in and around them, we can understand that the benefit experience has shown to follow the use of the iodide may be explained by established laws of physiology and pathology, and by the chemical properties of the remedy."

The amount of this remedy which Mr. Wells recommends is from one to three grains a day, given in divided doses. Along with this salt, attention to the rules laid down in the chapter on the 'Natural Treatment' is strongly enforced. In some cases, also, he advises the use of local treatment, as the ioduretted and nitro-muriatic baths, painting the parts with tincture of iodine, friction, percussion, douches, and so forth. We are sorry at not being able to agree with the author in very many points contained in this chapter. In the first place, we cannot think that deposits of urate of soda can be at all likened to the solid portions of the animal body; they consist essentially of extraneous matter, removed, we believe, from the sphere of vital influences, and in about as non-absorbable a position as a bullet lodged in any situation; at the same time, we do not wish to be understood as considering that chalky deposits are never removed, but that, when such occurs, it is by other methods rather than by absorption. Again, as to the solvent influence of iodide of potassium, we were not aware that it possessed any peculiar power in dissolving urate of soda, and seeing it so confidently stated, we were induced to make several analyses to ascertain the truth of this point. Solutions of iodide of potassium, chloride of potassium, and chloride of sodium, in distilled water, of equal strength, were employed, and made to act upon urate of soda for some hours, at the temperature of 100° Fahr. It was found that chloride of potassium had the greater power, next the iodide of potassium, then the chloride of sodium; the reason for the differences was obvious: urate of potash is a much more soluble salt than urate of soda, and therefore, when a potash salt acts upon urate of soda, it dissolves that body in proportion to the amount of potash contained in a given quantity, by converting a portion of the urate of soda into urate of potash, hence the chloride of potassium is a more potent salt than the iodide, and the iodide than the soda salts, but the carbonate of potash would be found still more potent; we have, therefore, no hesitation in stating that we consider the above views of the action of the iodide as altogether erroneous, and that the power of this medicine in dissolving gouty concretions is no greater than that possessed by

other salts; still we do not assert that iodide of potassium is not a useful remedy in old gouty cases, far otherwise, having been in the habit, for many years, of administering it in small doses in these cases; but we believe that its action is not upon the deposits themselves, but upon the surrounding tissues, which are apt to remain for a long time in a chronically inflamed condition; and we have found the salt equally efficacious in chronic rheumatic cases where no such urate deposits are present.

We have now given a short abstract, with comments, upon that portion of Mr. Wells' book relating to gout; an appendix is added, containing reprints of different papers which he has communicated to the 'Medical Times and Gazette,' but having no reference to the main subject of the work, we shall not allude to them. In conclusion, we would add that, although we have selected various parts of the author's work, and have commented freely upon them, we hope in a fair and open manner, and have in many points differed from his views, yet that we do not wish that our remarks should appear in the least degree depreciatory of the volume before us; most of the opinions we have criticized are, in fact, not held by Mr. Wells only, but by most authors on the subject, and therefore it is to the commonly received ideas, rather than to the author's views, that we wish our remarks to apply. We consider that this work contains both sound and rational views as to the pathology and judicious instructions as to treatment of gout; and we therefore believe that it ought to be perused by all who are engaged in the practice of medicine. The style and manner of the work are easy and attractive.

Alfred B. Garrod.

Review XI.

1. *Die Nahrungsstoffe. Grundlinien einer allgemeinen Nahrungslehre.* Von F. C. Donders, M.D., Professor in Utrecht. Aus dem Holländischen übersetzt. 1853.

Nutriments. By F. C. Donders, M.D., Professor at Utrecht. Translated from the Dutch.

2. *Lehre der Nahrungsmittel. Für das Volk.* Von Jac. Moleschott. Zweite Auflage.—*Erlangen*, 1853.

The Theory of Nutriments. A popular Essay. By J. Moleschott.

3. *Beiträge zur Heilkunde.* Von F. W. Böcker, Praktischem Arzte, Wundarzte, und Geburtzhelfer. Zwei Bände.—*Crefeld*, 1849.

Contributions to the Healing Art. By F. W. Böcker, Surgeon, &c. Two Volumes.—*Crefeld*, 1849.

4. *Einfluss des Kochsalzes auf die Harnstoffentleerung.* Von Professor Th. Bischoff, zu Giessen. ('Annalen der Chemie und Pharmacie,' lxxxviii. 109.)

Influence of Common Salt on the Excretion of Urea. By Professor Bischoff, of Giessen. (Liebig's 'Annals,' &c.)

5. *Einfluss des Wassers.* Von Böcker. (Im 'Zeitschrift der K. K. Gesellschaft der Aertze zu Wien,' April, 1854. pp. 308.)

On the Influence of Water. By Dr. Böcker. ('Journal of the Royal Imperial Society of Physicians at Vienna,' April, 1854. pp. 308.)

6. *Ueber die Wirkung des Biers.* Von Dr. BÖCKER. ('Archiv des Vereins für gemeinschaftlichen Arbeiten zur Förderung der wissenschaftlichen Heilkunde.' 1854.)

On the Action of Beer. By Dr. BÖCKER. ('Transactions of the Association for Promoting Scientific Medicine.' 1854.)

7. *Versuche über die Wirkung des Thees.* Von Dr. BÖCKER. ('Archiv des Vereins,' &c. 1853.)

Researches on the Action of Tea. By Dr. BÖCKER. ('Transactions of the Association,' &c. 1853.)

8. *Ueber den Kaffee als Getränk in Chemisch-Physiologischer Hinsicht.* Von Dr. JULIUS LEHMANN. ('Annalen der Chem. und Pharmacie,' lxxxvii. 205.)

A Chemical and Physiological View of the Effects of Drinking Coffee. By Dr. J. LEHMANN.

HOW is a man to know when he has got enough to eat?—enough in quantity? and enough in quality? These are indeed most vital questions, especially when we ask not for ourselves alone, but for dependents whose existence hangs on our right use of our reason,—for our prisoners, our servants, our paupers, our children.

Dr. Frerichs, in his well-known article on "Digestion," in 'Wagner's Physiological Dictionary,' has endeavoured to give us a way of finding an answer by the chemical analysis of the excretions. He reckons up how much urea, how much carbonic acid, and what salts are separated from the organism *during the entire deprivation of food.* He argues, that such is the necessary loss of substance in the body, and such must be the necessary supply. If by lungs, kidneys, skin, &c., so much carbon, nitrogen, hydrogen, &c., is given off, the amount of aliment required to be made into blood is that which contains an equal weight of those principles, in order that life may be maintained in the same theoretical stationary condition. Such a method of interrogating nature has been adopted also by Drs. Bidder and Schmidt, as may be seen in a recent article in this review, on 'Metamorphosis of Tissue.'

Dr. Donders objects to this indirect mode of computation, and compares Dr. Frerichs to a grocer, who, in order to estimate his stock of sugar, burns some of it, and weighs the ashes, instead of directly weighing the whole. We must demur to this comparison; the philosopher is not in the position of a shopkeeper, who, in taking stock, has everything under his thumb, and has only to produce his scales and to measure right on end: he is rather like an income-tax commissioner, with an uncommonly refractory return before him—an obstinate, sly fellow, who has kept no books and gives evasive answers;—such, with reverence be it said, is nature. The commissioner acts just like Dr. Frerichs: he says, "you have expended so much in improving your premises, so much in household expenses, &c., so your income must be at least equal to that amount." There does not appear any possibility of applying the direct method to the discovery of the exact quantity of food required to be made into blood, for the very obvious reason that we cannot ascertain how much of that put into our mouth is wasted; and it is probable that, if not by this, at any rate by some similarly indirect method, our future knowledge of the subject will be elicited.

It must be observed, however, that in Dr. Frerichs' argument it is assumed that in the starving condition the organs will still continue to remove from the body, in a minimum quantity, those effete particles which are no longer capable of life; and that the metamorphoses of tissue which then take place are all that are absolutely requisite for keeping together mind and matter. Here, if anywhere, lies the fallacy: we have no proof that in deprivation of nutriment the ultimate particles are not abnormally retained in the organism, and that starvation is not, in fact, a gradual interstitial death, as well as an exhaustion by unreplaced secretion. An architect might say, "I will calculate the quantity of stone and timber washed away by weather and wear from a building, and will send in so much to replace it,"—but no, that would not do; he must supply new timber and new stone in full quantity to *push out* that which is becoming injurious by decomposition—the renewal must be an active leading process, or the building goes to ruin. It is not stated that such is the state of the case in our animal body; but there is no proof that it is not; and if it is, then clearly enough the *excreta* are not a measure of the required *ingerenda.* If, however, the point can be made, that the removal of substance by secretion, up to a degree inconsistent with life, is the sole cause of death by starving,—that the necessary interstitial disorganizations go on without food as quick as with it,—this indirect mode of reckoning the amount of elements which must daily become blood will be of great theoretical importance.

An immediate application of this argument to practical matters was, of course, not contemplated by the author. Dr. Donders need not be afraid that he will be "unmercifully condemned to death by hunger," which he represents as the result of Dr. Frerichs' idea. Even if it is proved correct, there remains to be solved, before it is practically applicable, this further most difficult question,—*In what form* the elementary principles must be supplied so as to be capable of being made blood. Although a substance contains all the elementary atoms necessary to supply the waste of the body—carbon, hydrogen, nitrogen, sulphur, salts, water, and so on—and at the same time is perfectly capable of absorption and conversion into blood, yet it does not follow that it is sufficient to sustain life. In fact, though it is capable of absorption, it may be limited in capability as regards quantity; it may have the power of entering into assimilation only in a certain definite amount, and that amount may be more or less than sufficient for the wants of the organism. This seems to be the case with all the substances that form our aliments; pure albumen, pure gelatine, pure chondrine, cannot separately be taken up in sufficient quantity to sustain life, however much of them be passed through the alimentary canal. A combination of aliments is necessary, and what quantity of each is required to form the combination cannot be learned by finding the amount of carbon, hydrogen, &c., which they jointly have contained.

It is proper here to make a cursory mention of the division of aliments by Baron Liebig into supporters of respiratory combustion, and replacers of the tissues,—into "fuel," and "building materials." The striking simplicity of the theory involved, so like one of the great laws of nature, and the attractive style of the justly honoured author, has made this

classification very popular, and raised hopes that it would explain many things to which it is not applicable. But the fact is, it is not itself by any means tenable as a division. The building materials may be, and are, used as fuel, and the fuel as building materials. Flesh is to many carnivorous animals the only possible source of carbon, yet if anything has a title to be considered a pure replaçer of tissue, it is this substance. Oil is considered by Baron Liebig as fuel, and to justify this assumption, he has to carry *à l'outrance* an unfortunate saying of John Hunter's, that fat was "no part of the animal body," and to describe it as "only mechanically infiltrated with oil and water, like a sponge," and to state that those constituents possess no organic form, no vital characteristics. But what organic form would there be in the globe of the eye, what in the muscles even, without water? What would the brain and nerves, the very characterizers of vitality, if anything is, what would they be without fat?—not nervous matter at all. There, at any rate, fuel is used for building materials; and as other hydrocarbons seem capable of conversion into fat, they may become building materials too. Another objection to the theory is, that it represents oxygen as an inimical power, a sort of destructive Ahriman, against whose invasions it is necessary to have a guard in these supporters of combustion—a fire which tends to burn our house down if we do not feed it with other prey; whereas, in fact, oxygen is itself a building material, it unites with the albumen of the blood to form the fibrine of the muscles, the casein of the yellow elastic tissue, the substance of the skin, &c., &c. So far from there being any real opposition between oxygenation and nutrition, it is itself nutrition. In fact, the only truth which the theory expresses is, that in proportion to the expenditure of carbon, so must be the supply of the same material in some form or another. Great and important this truth is, and perhaps it was right in Baron Liebig to call attention to it by such bold expressions as the calling animals "locomotive furnaces," and the rough division of aliments above-mentioned; but they must not be carried further than the intention of the original author, and applied to subject matters for which they are unfitted.

Perchance the time may come when we shall be able to deduce, on purely scientific grounds, what the due admixture, and due quantity of such admixture, should be to supply an animal with sufficient nutriment. Perchance it is not far distant, but it is certainly still future. As yet our only practicable means of coming to any conclusion on the point, is to take a typical article of food, which we find by experience is capable of nourishing an animal for a considerable period, and make that the measure of what is required by the organism. Of course the article which answers our purpose best is milk, and we may fairly consider all the kinds of aliments contained therein as necessary to, and sufficient for, the sustenance of animal life. The protein compounds, hydrocarbons, and oils—represented in milk by casein, sugar, butter—with water and salts, may be viewed as comprising the whole of the supply of alimentary substances necessary to pure existence. All these substances are found again in some part of the body, are required to replace the continually decaying organs, and the relics of the decomposed tissues which they replace form the excretions. On these substances, without any others,

experience shows that life may be, and is, carried on in the greater part of the animal creation; they *fill up* the blanks occasioned by wear, and may be called, for the nonce, COMPLEMENTARY FOODS.

But not satisfied with these bare necessaries, we find that in practice our own species chiefly, but animals also to a certain extent, are inclined by a *soi-disant* instinct to feed on a variety of articles, the use of which cannot be explained as above; they cannot be refound in the organism; they cannot, apparently without dissolution, be employed to build up the body. Without compromising ourselves by pre-judging any question, these may be fairly called, as they are at the head of this review, EXTRA DIET, or ACCESSORY FOODS. It is scarcely necessary to say, that by this expression is meant alcohol, flavouring æthers, essential oils, perhaps gelatine, tea, coffee, pepper, tobacco, spices, opium, Indian hemp, &c. &c., which are absolutely in themselves accessory. And there is intended to be included also the great excess above what is to be found in milk, or required to replace secretion, which instinct leads us to take of such substances as water and salt, for example, which are, absolutely speaking, complementary.*

These are what man does not want, if the protracting from day to day his existence on earth be the sole end of his feeding. He could live without them, grow without them, think without them—a baby does. Would he be wise to try and imitate it? The answer to the foregoing question must lie first in an accurate scientific observation of the true physiological effect of these substances on the human frame; and the knowledge thus gained must precede any balance of the advantage accruing from them with their social or political results. With such a feeling it is intended in the present article to narrate the chief recent advances which have been made in that direction.

Let us at once take a cold plunge into the subject, and begin with WATER.

Dr. Böcker has published some observations made on himself to show the effect of different quantities of water drunk. The experimenter appears to have used the utmost precision, and details so conscientiously the mode adopted of making his estimates, that additional knowledge may in future times perhaps alter the conclusions drawn, but can never lessen the value of the experiments. After he had determined, by some preliminary trials, what quantity of food and drink was just sufficient to satisfy his appetite without causing the body to diminish in weight—that is to say, to cover the necessary outgoings of the organism—he proceeded to special experiments, in which he took the ascertained quota of victuals in periods of twenty-four hours. These special experiments are in two sets. The first set extend over seven days, in each of which the experimenter took, on the average, 1260 grammes (2·66 pints imp.) of water; the second set also over seven days, in which he took 3360 grammes (7·11 pints) of water. The urine made during the twenty-four hours was collected as follows; it was passed on first rising in the morning, and to

* Should any of our readers object to the division of foods into "complementary" and "accessory," it is fair to the works named at the head of this article to say that it is not derived from them, and simply used in this place to make the object of the present writer more clear, and to point out unmistakably of what class of bodies he is speaking.

that quantity was added all that was secreted up to the same hour on the day succeeding, and then weighed and analyzed. After emptying the bladder, he took his weight naked, and repeated the weighing at definite periods during the day, allowing for the ingesta. The amount also of solid and liquid matter in the fæces was directly weighed, and the insensible perspiration estimated. The results of these two series of experiments exhibited the following mean numbers:

In the first series, with 1260 grammes of water,	In the second series, with 3360 grammes of water,
the daily exercise amounted to	
84·14 minutes,	90·14 minutes,
and the daily loss of weight was	
539 grammes.	834 grammes.
The fæces daily excreted amounted to	
178·3 grammes,	219·5 grammes,
of which the water was	
129·6 grammes,	170·5 grammes,
and the solid portion	
48·7 grammes.	49·0 grammes.
The urine daily excreted was	
2621·143 grammes.	4994·000 grammes.

He felt during the days when the larger quantity of water was taken, more desire for food, and more languor after exercise, though, as may be seen, it exceeded by six minutes only that taken on the other days. No other subjective observations of any importance appear to have been made.

This sketch of Dr. Böcker's experiments is taken from the periodical published by the Imperial Medical Society of Vienna, and it is to be regretted that it has been found impossible to obtain in time access to the original paper. The consequence is, that the analysis of the urine containing the exact difference in the amount of urea excreted on the several days is not known to us. Thus far, however, partly the numbers above given, and partly the account by Dr. Weinberger in the periodical quoted, enable us to go, viz.:

1. That water increases the interstitial metamorphosis of tissue and consequent loss of weight.
2. That the decomposed tissue is excreted partly by urine and partly in the solid fæces.
3. That the water formed in the organism by the change of tissue is augmented, as well as the nitrogenous constituents of the excretions.

It will be seen by the table above, that on the full water days 4994 + 170 grammes are excreted, being an excess of 1804 grammes over the quantity drunk; whereas on the ordinary water days 2621 + 129, being an excess of 1490 over the quantity drunk. The quantity of water, however, in the solid food, which of course constitutes some of the excess of secretion, was the same under both circumstances.

4. The excretion of carbon by the lungs, the quickness of pulse or of respiration, is not affected.
5. The necessity for food keeps pace with the metamorphosis of tissue.

The increased rapidity in the metamorphosis of the solid parts of the body, from the use of a quantity of water exceeding that which the thirst

and necessary excretions demand, is a most important fact. Its full application belongs to our reflections on medicinal discipline for abnormal states of body, but yet, as an accessory food for the healthy, it should not be passed over. Metamorphosis of tissue is *life*, or an inseparable part of life, and there is reason to believe that, where it goes on quickly, and there is the possibility of a supply of new matter equal to the exhaustion of the old, the tissue changed is in a more perfect state, more able to resist external noxious influences, and therefore more likely to last long than when the exchange is slow. When, then, a man is able to get as much as he wants to eat, is able to carry it without inconvenience in his alimentary canal, and to absorb it to an indefinite amount, the extra quantity of water is wisdom on his part, for it makes him more lively and active. But not all are habitually in this typical condition; to many of our readers the latter clauses are probably unattainable—an extra quantity of food is a trouble to them, and the absorption of it painful or impossible; while those who mix much with the masses of their fellow-countrymen find a large multitude whose social circumstances prevent the fulfilment of the first requirement. To all of these, an extra allowance of water as a habit can only be viewed in the light of an extravagance.

The use of Salt as a solvent to albumen is of great importance in economical cookery or dietetics, for without it much of that material would run a chance of being wasted for want of absorption. It is more required for vegetable than for animal diet on two grounds—first, because there is in the former so small a quantity of albumen that we cannot afford to lose any of it; and secondly, because plants contain but a small proportion, not nearly as much as is wanted for the solution: while flesh, on the other hand, especially when the gravy is retained in it, already possesses a large allowance.

It is stated by those who have had an opportunity of seeing individuals of our species in the unfortunate condition of a deficiency of kitchen salt, that, under such circumstances, a sort of scurvy is generated, that a low state of system arises, leading to the growth of parasitic animals in the bowels, especially tape-worms. Nay, so refined has been the cruelty of man to his brother, that a torture has actually been devised consisting of the deprivation of salt under a vegetable diet, the consequence of which was intended to be that the wretched victim should be devoured by self-engendered worms.* The more vegetable a diet is, then, the more is salt required by our species.

Acting either on this principle or on empirical observation, it has long been the custom to mix salt with the fodder of domestic animals, and inasmuch as some expense is involved in this proceeding, it is interesting to know whether it is really of any use or not. To determine this, M. Boussingault tried a series of experiments on steers, which led to the conclusion that it in no degree contributed to their condition.† A long series of similar experiments on cavalry horses‡ have been tried also in France,

* In the ancient laws of Holland. Lord Somerville, quoted in Pereira's Materia Medica, vol. i. p. 535.

† Annales de Chimie et de Physique. 1847, p. 117 et seq.

‡ Recueil de Mémoires et Observations sur l'Hygiène et la Médecine Vétérinaires Militaires. 1851, tom. iii. p. 5 9. The horses in prime condition were not improved, and the thin ill-conditioned animals were if anything deteriorated after the use of salt.

with a similar conclusion; so that from them we should say, that salt used in this way by the farmer or the groom was unjustifiable on scientific grounds, whether agreeable or not to the animal. But it is to be remarked, in the first place, that the experiments were tried with hay, which in itself contains more salt than most vegetables, so that they prove nothing against its advantageous use with other fodder; then, again, only the external condition of the animals is noticed, and if that was good to begin upon, no very obvious improvement could be expected to be visible to the eye. To afford a satisfactory test, the solid contents of the blood at the commencement and end of the trial on healthy horses should have been observed; in fact, these experiments do not militate at all against salt being with most diet, and under most circumstances, a valuable accessory.

The recent experiments which best show the influence of salt over the destruction and removal of effete tissues are contained in Dr. Bischoff's 'Harnstoff als Maas des Stoffwechsels.' In a recent paper published in Liebig's 'Annalen,' he has somewhat corrected and explained certain statements therein made, and from it, therefore, the citation will be made. We read here that a dog taking daily a pound of beef without salt, excreted 22·50 grammes of urea, while with the addition of salt to the drink he excreted 28·34, showing an increase in the chief evidence of the metamorphosis of nitrogenous matter of 5·84 grammes daily when this accessory was taken.*

Now solely on this information we should not know whether the final result of taking an accessory quantity of salt was injurious or beneficial. It might appear at first sight only to have an exhaustive interference, taking away that which an effort of the organism is required to replace. But it must be remembered that it is in that effort that life consists, and that within the limits of health the more metamorphic action there is going on, the more truly a tissue may be said to live, the more perfect it is and is likely to become. So that we may on these grounds rather anticipate an augmented efficiency and a nearer approach to typical perfection from this increased action, in the same way as a muscle grows by fair use. Such a hope seems confirmed by some experiments detailed in the 'Comptes rendus de l'Academie des Sciences,' vol. xxv. p. 109. M. Plouviez, a strong healthy man, took, in addition to his ordinary food, two and a half drachms (English) of common salt every day for three months. Analyses of his blood made by M. Poggiale showed the carbonates of soda and potass as constituting 0·48 part in 1000 before the experiment, and 0·56 after its conclusion. This increase of salts moreover was not due to an augmentation of the fluids and substances soluble therein, but was coincident with a proportionate increase of globules, fibrine, and fat, the proportion of water in a thousand parts having sunk from 779·92 to 767·60.

* With respect to the urea being taken as a test of metamorphosis, it is to be remarked that it is probably a fair comparative, but not an absolute measure. The above-named dog, for instance, took 6000 grammes of flesh, containing 180·60 grammes of nitrogen, in 11 days, but the urine excreted contained but 159·20 grammes of nitrogen, so that 21·40 grammes are unaccounted for, and must have been got rid of in other ways, for the animal did not increase in weight. The salt also is not all excreted by the kidneys. The dog took 158·82 grammes of chloride of sodium, and passed in urine 145 grammes, so that 13·82 remain to be accounted for, the chlorine being probably united to other bases, and the sodium to other acids.

The effect, therefore, of salt is very analogous to that of water, and the same remarks might be made upon it. Where food is deficient in quantity or quality, it is evidently improper that an excess of salt should be used beyond that which is just sufficient to act as a complementary aliment and to dissolve the albumen; all beyond this is waste or worse. Encouragement should be given to employ instead other spicy flavourings which have not this tendency, or which have even a contrary tendency, as we shall see further on there is reason to believe is the case with several accessory aliments.

Without entirely anticipating all that is going to be exhibited by a detail of the valuable observations of the experimenters before-mentioned and others, it may be as well to state that the accessory aliments alluded to as possessing powers antagonistic to or contrasted with those of water and salt, are those which now follow, namely, alcoholic drinks, sugar, and theoid infusions.

The experiments of Dr. Böcker on the actions of ALCOHOL appear to have been made as carefully as those already detailed on the effects of water. He lived as usual, and took seven or eight times a-day a tea-spoonful of spirits of wine. The immediate results may be stated in the five following deductions:

1. Alcohol diminishes the excretion both of the solid and fluid constituents of the urine.

The following table exhibits the daily difference between the ordinary excretion and that which took place under the influence of alcohol, taking a mean of 9 days of the former and 6 days of the latter.

	Grammes.		
Under the use of alcohol there were excreted	1151·739	less	urine.
" " "	1115·493	"	water in it.
" " "	36·246	"	solid constituents.
" " "	13·366	"	urea.
" " "	0·091	"	uric acid.
" " "	0·093	"	mucus.
" " "	9·351	"	fire-proof salts.
" " "	0·278	"	earthy phosphates.
" " "	13·359	"	salts decomposed by heat and extractive matter.

2. Alcohol does not increase the cutaneous perspiration.

This is not measured, but judged by experience. Dr. Böcker found that at night indeed he perspired somewhat more than usual, but by day much less. This shows, at any rate, that the skin does not take the place of the kidneys in exhaling water under the circumstances experimented upon, for had it done so, the body would evidently have been bathed in perspiration all the 24 hours.

3. Alcohol does not augment the fœcal excretion.

4. Alcohol diminishes not only the absolute quantity of carbonic acid exhaled by the lungs, but also the relative proportion of it in the products of respiration.

The experimenter calculates that when using alcohol he excreted daily

165744 cubic centimetres less than his ordinary quantity. It is no doubt open to conjecture that there occurred a compensatory increase in the carbonic acid excreted by the skin, but as that is reckoned by Dr. Hannover to be at most only one-twenty-fifth of the excretion of the lungs, it is difficult to imagine it could to any practical extent take their place. As to any compensatory excretion of the gas by the bowels, that would be obvious enough to the senses.

5. The excretion of water by the lungs is unaffected.

The observations on the blood which follow in the original essay relate to the chronic and not the immediate effects of alcohol. They compare the circulating fluid of the habitual temperate brandy drinker with that of a typical man, and find it deficient in solid organic constituents as a whole, deficient in fibrine as compared with albumen, and with the red particles apparently more carbonized, at least more black, than in perfect health. Two circumstances, however, must be considered before we allow these phenomena to be the pure results of alcohol; in the first place, the subjects were not in perfect health; one had tumbled down in going to church on a dark Christmas morning, another had headache, and so on; and, secondly, the mere fact of their habitual brandy-drinking shows a deficient energy of constitution arising perhaps from the very anæmia described—the state of blood may have been the cause, not the consequence, of the instinctive resort to a stimulant.

What now are the deductions from the above-detailed immediate physiological actions as to the right use of alcohol in diet?

"Alcohol," says Dr. Moleschott, "is *a box for savings*. A man who eats little and drinks moderately of alcohol retains in his tissues and blood more than he who, under corresponding circumstances, eats more without taking beer, wine, or brandy. Clearly then it is hard to rob the labourer, who in the sweat of his brow eats but a slender meal, of a means by which his deficient food is made to last him a longer time."

This is a little one-sided. When alcohol limits the consumption of tissue by metamorphic secretion, and so the requirement of aliments, while at the same time the man goes on working, it is right to inquire whence comes this new strength. It is supplied by something which is not decomposition of tissue—what is it then? A truly vital question, but one that must be answered before the above-quoted arguments can be allowed full sway, for on it depends the knowledge whether a man is only gaining additional strength or wasting his body, spending his income or diminishing his capital.

However, there is also a middle road; a man may so spend his capital as to enable him to replace it with interest afterwards, and be in a more prosperous condition than if he had not speculated. And such may possibly be really the state of the case as respects alcohol: it may, by its raising of the nervous energy, enable a man so to use his body, that during the consequent rest he absorbs or fixes enough to place himself in a better state than before. It is possible that by its purely physical consequences it may enable the body to make up for the immediate primary loss which it entails. But this is only a possibility, it cannot yet be used as a *fact* in favour of alcohol.

The really strong point is one grounded not on physical agency at all;

and it is one which curiously enough seems to have been quite passed over by Dr. Donders, Dr. Moleschott, Baron Liebig, Dr. Pereira, and all other modern dieticians, viz., the effect of alcohol as a prophylactic against the destructive energies of the mind. It is unnecessary to quote here proverbs in all tongues to show how work purely mental exhausts the body; how, for instance, not only the painful emotions, care, sorrow, anxiety, but the nobler enthusiasms, the afflatus of the poet, the ambition of the patriot, the fixed attention of the scholar, the abstraction of the lover, fret to dust their tenement of clay. Whether this arises from defective assimilation or increased destruction in the tissues is not known, and does not affect the argument. Animals, so far as we know, have not these causes of friction in their machinery, and require no defence against them. But we, thanks to the tree of knowledge, all of us daily experience them more or less, sometimes in a pleasant, sometimes in a painful degree, and to soothe our moved minds instinctively or rationally adopt some of the remedies which nature and art afford. "Then alcohol is a medicine, not a food?" Really it does not seem of any importance which you call it. If the passions instanced above are natural and normal, then it is a "natural and normal medicine;" and between that term and "food" the boundaries are too fine for practical purposes. With those who deny that the higher employments of the soul are natural, no arguments will avail.

Hitherto, that abstract being, an average healthy man, has been considered the representative of his class; but such is not the real subject matter either of the political economist or of the physician. A great crowd of those with whom we are in daily converse, useful working members of society, are either from birth or external causes under the necessity of accommodating the defects of their body to their circumstances by the exercise of reason. If they were mere animals, they would soon die; but being men, and able to adopt what are sometimes called "unnatural" habits, they live. Among these there are a great many who have found that they are the healthier when entirely abstaining from alcohol; but there are also many more who find that such a course would infallibly shorten their days and make them miserable. They exist by making a medicine (if we like to call it so) part of their food. It will not do in the present day of practice as opposed to theory, to ignore these weaker vessels, as Plato does in his model republic, and say, "let them die;" for there is just a possibility that they may constitute a majority, and at all events, they are an important minority. Alcohol they must and will have, for they have a right to demand it.

The reader must believe that it is under a great sense of responsibility that these few sentences in favour of the use of alcoholized stimulants are laid before him. It is superfluous to say how the use is defiled by the abuse, how the curse rings out so loud that the quiet blessings are unheard. A Silenos may well cry, in merited repentance—

"Ὦ Βρομίε, διὰ σὲ μυρίους ἔχω πονοὺς,"

but a thoughtful, reverent mind may discover sufficient evidence that the good outweighs the ill, and instead of condemning with superficial haste as an enemy the powerful agent he sees before him, will try and make it

more and more friendly to his species. To such a mind the following considerations will possess much interest.

Alcoholized stimulants are not all alcohol. Their power over the nervous system and mind does not bear even a direct ratio to the quantity they contain. Many other ingredients certainly contribute much to their gladdening of the heart, and very probably, also, to their benefit to the body. Sugars, acids, essential oils in great variety, fruity ethers constituting the flavours or "bouquets" of wines, tar, turpentine, &c. are the differences between one and another. A certain quantity of alcohol seems, indeed, essential to their wholesomeness and popularity; but experience shows that many of these compounds which contain almost a minimum amount of it, are most beneficial to the individual, and therefore to the nation. In using these the temperate man is less likely to exceed by error, and the indiscrete is under less temptation. They have the same advantage as finely graduated scales over coarse ones, they are a better measure. As a rough rule, it may be said, that those fermented drinks are most worthy of approbation which produce the greatest amount of comforting and exhilarating effect with the least amount of alcohol, reserving, however, the possibility that there is a certain minimum, beneath which the alcohol should not descend.

Instances will bring this subject most home to our feelings, at the same time as they will enable a few cautions to be given concerning the application of the general law, and circumstances which may modify it.

Beer, perhaps, fulfils the above-named desiderata better than any of the accessory drinks of our country; a small amount of alcohol is mixed with a still smaller amount of narcotic, the whole diluted with water, sugar, and flavouring substances, the products of the semi-combustion of the malt. The sum total of health and happiness derived from a moderate allowance of beer with the mid-day meal, can only be appreciated by those who have thought seriously on this subject, and made special inquiry among our quiet, temperate countrymen.

At the same time, it must be fairly conceded, that the classes which exceed in beer, do appear to suffer in constitution more from their folly than those that exceed in wine. Perhaps this arises from their station in life preventing them from otherwise defending themselves against disease, but partly, also, it is due to the frequently adulterated nature of the liquid they consume. The term "adulterated" is not intended to be restricted to that product of deliberate wickedness by which the simple public is induced to drink cocculus indicus, burnt sugar, quassia, &c., but also to the consequences of thoughtless stinginess on the part of manufacturers of high standing. The writer has had occasion to descend into a vat at one of our great metropolitan breweries, prepared for the immediate reception of porter, and found it so saturated with volatile acetic acid, that he could not keep his eyes open, so sharp was the vapour. In half an hour this was all mixed with the beer, and in ten days was probably all drank. Now a simple washing with water would have made the vat capable of giving birth to a pleasant and wholesome beverage, instead of one undergoing the kind of fermentation most noxious to the system. Surely there would be no tyranny in the appointment of a tribunal which should care for these things. The principle of inspection of private pro-

perty which may peril human health on a large scale has long been conceded. "If there be any meaning in this legislation—if it imply any principle, the meaning and the principle require to be developed into a general law, that every establishment employing labour be liable to inspection and regulation in regard of whatever acts and conditions are detrimental or hazardous to life."* What can be more so than the selling a noxious article cheap, under the name of a wholesome one worth a higher price?

The real effects of Beer, taken in somewhat greater excess than we should recommend, are well exhibited in some experiments published by Dr. Böcker, and named at the head of this article. The experimenter took, during the observation of the urine, his ordinary diet, except that he added to it at breakfast half a maass (about 1 imperial pint) of sound home-brewed beer, containing 47·2 parts per 1000 alcohol. When observing the variations of the pulse, and excretion of carbonic acid, he took various recorded quantities, from one to as much as five maass.† The result of these experiments is, that there is a general resemblance between them and those with pure spirit, modified apparently in close proportion to the smaller quantity of alcohol contained in the drink under discussion, and to the amount of the antagonistic agent—water—therein absorbed. The only well-established particular which is not explicable on these grounds, is the much greater quantity of chloride of sodium excreted in the urine under the use of beer than of alcohol; a difference, for the cause of which we must look to the other substances contained in the compound —viz., to the extracts of hops and of malt, the sugar, æthers, &c., or to their combined action. According to the analyses of Herr von der Marck, beer contains scarce a trace of chloride of sodium, and very little chloride of potassium; yet on the beer days, the experimenter found three grammes more of the former salt were in his urine than on the other days. So that there is no doubt about a physiological action of this aliment independent of the alcohol and water it contains.

In the above-named paper, the experimenter has not wholly confined his attention to the excretions; the variation in which from beer, being so analogous to those induced by alcohol in a dilute degree, need not be here repeated. But he has also noted the immediate changes wrought in the circulating blood. It must be allowed, however, that nothing very decisive comes out of these observations. Three persons in good health were bled, and the blood analyzed, first, after a fortnight's course of teetotalism, and secondly, after a diet of eight, fourteen, and fourteen days' duration respectively, taking from two to three maass of beer daily. The result was a decrease of water, an increase of fibrin, an increase of coloured clot. The clot, however, reddened with exposure to air much less rapidly than in quite normal blood, and contained many more of the pale, unnucleated globules than is usual in the condition of perfect health. These

* Preface to Reports relating to the Sanitary Condition of the City of London. By John Simon, F.R.S.

† In estimating the accuracy of Dr. Böcker's powers of observation, it is necessary to remember that the beer was mild. London porter contains from 65 to 80 parts, and "Bass" as much as even 120 parts in a 1000 of alcohol, that is, is nearly three times as strong as the German. The maass varies in different parts of Germany from 2 to 3½ pints; it is probably the smaller measure that is used at Radervornswald.

paler globules, it is to be observed, Dr. Böcker holds with Dr. Virchow, to be defunct bodies, no longer capable of performing their duty of absorbing oxygen; a view which has received strong confirmation from some experiments of Dr. Moleschott's, published in 'Müller's Archiv,' in which he found that frogs, from whom the liver had been excised, lost their powers of expiring carbonic acid and absorbing oxygen in the proportion as those cloudy-tinted globules increased in number. The inference, therefore, which he draws, is, that the augmentation of solid matter in the sanguineous system from the drinking of beer is no evidence of increased vital powers, but merely a retention of partially effete matter. The observations, though not very conclusive, are, at all events, a correction of what might be inferred from the previously-quoted analyses of blood from brandy drinkers. They show, in fact, that the immediate consequence of alcoholic drinks is not the diminution of the solids in the blood.

As in the case of beer, so, too, of WINE, experiment shows a considerable resemblance in its effects to those of pure alcohol modified by dilution; while, at the same time, there are certain differences from both liquids, important in a practical and scientific point of view.* The wines employed by Dr. Böcker were Niersteiner, a good second-class white Rhenish wine, and Walportzheimer, a red wine, made indeed in the Rhine country, but from the Burgundy grape. From one and a half to two and a half bottles were drunk daily, without otherwise altering the diet. The results were in both cases a diminution of the quantity of carbonic acid expired, more marked, however, in the Walportzheimer than the Niersteiner; a striking diminution in the loss by earthy phosphates, and a scarcely perceptible alteration in the cutaneous, urinary, and fæcal excretions. The author proposes, at a future opportunity, to try the effects of effervescing and foreign wines,—experiments which will possess more interest for our countrymen than those made on the insufficiently appreciated German grape.

The mention made of the peculiar limitation of the loss of earthy phosphates by wine, leads us to the mention of another accessory food of wide-spread use—SUGAR. The result of observations made on the excretions during the use of it by Dr. Böcker,† show that it, too, restricts the waste of the body by decomposition, and that its effects are most marked on these products of the destruction of bone. The mean of eleven days exhibit, under the use of sugar, in the amount of earthy phosphates in the urine of twenty-four hours, for each kilogramme of bodily weight, a change from 0·0263 gramme to 0·0250, and a proportionate decrease in the phosphate of lime and magnesia respectively. The dietetic and medical deductions from these facts demand a separate consideration at a future time, and it is mentioned here simply to give an illustration of one of the complications which the presence of this substance in mixed drinks induces.

Another complication arises from the salts contained in them, especially in the German wines experimented upon. Observations made by the

* Dr. Böcker's Beiträge zur Heilkunde, Band i. † Ibid.

same indefatigable physician who has been so often quoted lead to the conclusion, that acetate of potass, while it augments the general amount of solid constituents in the urine, owes that augmentation chiefly to the chlorides, and that it, like sugar, diminishes the loss of phosphates. Here, however, we are getting into the domain of materia medica, rather than of diet, and would merely remark, that the tartaric and acetic salts of wine must not be left out of consideration, till we know by experience their real physiological value.

There are, then, to be found in alcohol real uses—it is a defence against the evils of defective nutrition dependent on either social or pathological causes, as well as a defence against the wear of the body by that immortal part which is indeed the end of our being. And in mixed alcoholic drinks we have presented to us modes of modifying these defences, so as to suit each particular case, whether national or individual. Surely then that is a truer philanthropy which turns its attention to increasing the variety and quantity of wholesome fermented liquors, than that which, by precept or example, endeavours to deter men from them altogether.

Tea, Coffee, and Chocolate, have a much less suspected character than alcohol: it is only as medical men, and in exceptional cases, that we can be called upon to say anything against them. And even then we can often avoid a direct condemnation by modifying the times and modes of taking them. No accusation having been made of social or individual injury of calculable extent resulting, and a very decided gratification occurring, there can be no doubt of their use being a gain to the nation. They are a pleasure without consequent pain.

But shall we attribute no further value to these articles? Shall we say that money to the amount of twenty-six million sterling, annually spent by our country in their purchase, is laid out on a temporary titillation of the nerves, and that just as much has to be expended on other food as if this luxury had not been imported?

Such questions are answered by an equally elaborate and self-sacrificing collection of experiments upon himself by Dr. Böcker, and detailed in the paper named at the head of this article, for the purpose of testing the effects of Tea on the organism. The first set of the first series consists of seven observations of twenty-four hours' duration each, in the months of July and August, with three barely sufficient meals *per diem*, in quantities as nearly equal each day as could be managed, and with only spring-water to drink. The second set comprises the same number of observations in August, September, and October, under similar circumstances, except that infusion of tea, drank cold, was taken instead of plain water. Each day there are carefully recorded the quantity of urine, of eighteen of its ingredients separately, the weight of fæces and of the water and solid matter contained therein, with the degree of alkaline reaction, colour, and odour, the amount of insensible respiration and of expired carbonic acid, the quickness of respiration, the beats of the pulse, together with accurate notes of the duration of bodily exercise in the open air, the loss of weight in the whole body, the general feelings, and the circumstances, thermometric, barometric, and meteoric, under which the observations are taken.

It was desirable, for the accurate comparison of the results, that a nearly equal (and that necessarily a *limited*) quantity of food should be eaten daily; and, in consequence, there was a certain loss of weight entailed. This might seem to some persons to vitiate the conclusions, inasmuch as the body was not quite in a normal state; so a second series of seventeen experiments, of equal duration, were made, and at a different time of year, so as to answer the question which might arise as to whether the season made any difference. In these the weight of urinary constituents, and of the fæces, are examined under the three following circumstances—viz., while taking tea as an ordinary drink, on the days immediately following the leaving it off, and on other days when it was not taken. Solid food was eaten in measure limited only by appetite.

A third series of four experiments was also made, during four fasts of thirty-six hours each, two with water only, and two with tea to drink. On these occasions the author's business did not allow him to place himself under precisely equal conditions of occupation, and, moreover, his weight at the commencement of each observation was not the same. So that in some phenomena, especially as respects loss of substance, they do not agree with the two former series.

However, in the following particulars, all the three series so entirely coincide, that the conclusions will be set down as general deductions from the whole. The details of each will be quoted only as illustrations, or as indications of modifying circumstances:*

1. *Tea, in ordinary doses, has not any effect on the amount of carbonic acid expired, the frequence of the respiration, or of the pulse.*
2. *When the diet is insufficient, tea limits very much the loss of weight thereby entailed.*

This is strikingly shown in the first series of experiments. In the seven days on which tea was taken to drink, the weight of solid matter eaten was, on an average, 12·39 grammes (7 drachms avoird.) less than when water alone was drunk: yet the loss of weight of the whole body was, on each of the former days, but 203 grammes, on the latter, 539 grammes, showing a wear of 336 grammes (nearly 12 ounces avoird.) less under the influence of tea than with water only.

3. *When the diet is insufficient, the body is more likely to gain weight when tea is taken, than when not.*

This is shown in the second series of experiments; the tea-drinking days of which are the only instances of augmented weight.

4. *Tea diminishes very much the loss of substance in the shape of urea.*

In the first series the daily allowance, though less copious on the tea days, was more nitrogenized, and nitrogen, also, it must be remembered, was taken in as thein, yet in spite of this the quantity of urea secreted in twenty-four hours was nearly a gramme less than on the water days, the numbers being in the first case 34·221, in the latter, 35·194 grammes. The quantity of water and other constituents passed in the urine was also lessened.

Still more strikingly is this shown in the days of complete fast, when

* For the details of Böcker's experiments, see this journal, No. 24, p. 549.

pure spring water is seen to cause a greater loss by urea than infusion of tea, in spite of the supply of nitrogen contained in the latter. The difference also is seen to exist in spite of an increased amount of bodily exercise.

5. *It lessens remarkably the quantity of fæces secreted.*

In the first series of experiments with insufficient diet on the tea days their weight was, on an average, 96 grammes, on the water days 178 grammes. In the second series it is remarkable that on the days immediately following leaving off tea and taking to water a great augmentation of the fæces is noted, as if water alone acted as an evacuant in those who are habituated to tea.

6. *The loss by perspiration is also limited by tea.*

In the first series it was 1335·7 grammes on tea days, on water days 1349·9 grammes.

Parallel with these observations there run a set of experiments made by Dr. Julius Lehmann on two individuals to exhibit the effects of COFFEE on the excretion of phosphoric acid, chloride of sodium, and urea by the kidneys. They are less full than Dr. Böcker's, in that they concern the urine alone, and are less in number; but, on the other hand, they are more complete in showing the separate actions of the several constituents of the coffee bean—viz., caffein and empyreumatic oil, as well as of the mixture. Some of the effects of excess are also shown, to which the paper on tea makes no reference. The results are as follows:—

"1. That coffee produces on the organism two chief effects, which it is very difficult to connect together—viz., the raising the activity of the vascular and nervous systems, and protracting remarkably the decomposition of the tissues.

"2. That it is the reciprocal modifications of the specific actions of the empyreumatic oil and caffein contained in the bean which call forth the stimulant effects of coffee, and, therefore, those peculiarities of it which possess importance in our eyes—viz., the rousing into new life the soul prostrated by exertion, and especially the giving it greater elasticity and attuning it to meditation, and producing a general feeling of comfort and cheerfulness.

"3. That the protraction of metamorphic decomposition which this beverage produces in the body is chiefly caused by the empyreumatic oil, and that the caffein only causes it when it is taken in larger quantity than usual.

"4. That caffein (in excess) produces increased action of the heart, rigors, derangement of the urinary organs, headache, a peculiar inebriation, delirium, and so on.

"5. That the empyreumatic oil (in excess) causes perspirations and diuresis, quickened motion of the bowels, and augmented activity of the understanding; which may indeed, by an increase of dose, end in irregular trains of thought and congestions, restlessness and incapacity for sleep."*

Though both our authors have frequent occasion to allude to the effects of tea and coffee on the mind, produced as they have just reason for concluding through the body, yet they do not seem to have thought of taking into consideration the reciprocal consequence, the reaction of the spiritual on the material. But we cannot doubt that while mental com-

* We may refer here to an analysis of a paper by Dr. Zobel on coffee, given in a former number of this journal, No. 24, p. 548.

fort results from the physiological action of these aliments, this mental comfort also helps towards the healthy working of the organism. The subject is too familiar to need much illustration, and has been lately brought under the reader's memory. Perhaps, too, they have not allowed sufficiently for the effect of habit on the subjects of their experiments,—that is to say, of habit acting through the mind. When a man has been used to take tea or coffee daily for many years, it is a constant slight source of annoyance to give it up, and this may cause him to exhibit rather more loss of substance under water-drinking than arises from the mere physical action of the change. If an individual has always walked with a slouch, or with his hands in his pockets, or touched the posts as he went through the streets, he would, if debarred from these customs, most likely pass an increased amount of urine and fæces. Recruits always lose weight, though their work may be less laborious than previously. And it is difficult to say how long this mental influence would last. Dr. J. Lehmann permits, indeed, a few days to pass over before he commences his estimate; in fact, he waits till the amount has got steady, but it may be doubted if that is quite sufficient. Dr. Böcker has not allowed for this disturbing influence at all. However, though those latter considerations may make us think the figures in the results perhaps a little exaggerated, they by no means invalidate the conclusions.

The distinct statements of Dr. Lehmann and the daily records by Dr. Böcker of his feelings and sleep, of the colour, smell, and consistence of urine and fæces, show that the subjects of these experiments were in a practically normal state during the whole of the time they were under observation, so that any fallacy supposed to arise from pathological causes for the variations in the bodily phenomena is excluded. We may take them to represent the real effects of tea and coffee on a healthy person.

What an important effect this is! The tea and coffee drinker may have less to eat, and yet lose less weight—wear his body out less—than a water drinker. At a comparatively small expense he may save some of the costly parts of his diet, those nitrogenized solids that entail so much thought, labour, and anxiety to obtain. The loss of carbon indeed goes on much as usual, and a moderate outlay will supply that—but what an economy it is to spare the quantity consumed of meat, bread, milk, and all the most expensive viands! Besides the thein (or caffein, for they may be viewed for the present purpose, at any rate, as identical) and the essential oils, there is contained in both tea and coffee a certain amount of difficultly soluble vegetable albumen, and in the former especially a large quantity of tannin. The presence of these substances introduces several modifications in the modes of using the plants as a beverage, and renders one or the other best fitted for people under different circumstances. The tea leaf, infused for a short time, parts with its essential oil and a small portion of alkaloid, a good deal of which with the tannin and vegetable albumen is thrown away with the grounds. If it stands too long or is boiled, more indeed is got out of it, but an astringent disagreeable drink is the result. Hence it is most suitable for those who can afford to waste some of their food, for the sake of having the rest more agreeable. The boiling of coffee extracts all its oil and alkaloid too, and, when it is drunk in the Eastern method with the grounds,

allows the whole nutriment to be available. Even when strained it is clearly more economical than tea, and appears therefore the most proper beverage for a poor man. It may be doubted, however, whether we might not make our tea go further than is at present the custom, if we were to adopt other modes of preparation. The following description of the cookery adopted among the Buratsky Tartars is from the travels of Bell of Auchterony, written in the middle of the last century, but it is to be observed that MM. Huc and Gabet give a similar account of that employed in the wilds of Chinese Tartary in the present day.

"A large iron kettle was placed on the fire, and wiped clean with a horse's tail, then water was put in, and then coarse broken tea and salt. When it was near boiling, she took a large brass ladle, and tossed the tea till the liquor turned very brown. It was now taken off the fire, and after subsiding a little was poured clear into another place. The mistress now prepared a paste of meal and fresh butter, that hung in a skin by the horse's tail, which was put in the kettle and fried. Upon this paste the tea was poured, to which was added some good thick cream. The ladle was again employed for about six minutes, when the tea being removed from the fire was allowed to get cool."*

In this there appear three points worthy of at least modified imitation under some circumstances. The mixing of the salt with the tea makes the albumen more soluble, and enables it to be digested, and really with use becomes just as palatable as sugar. Then the consumption of the whole decoction allows of no waste. Thirdly, the addition of meal forms a mixture of complementary and accessory food which must be exceedingly nutritious, while at the same time it probably diminishes the objectionable taste of the tannin. The whole dinner reminds one of the Australian diet of "tea and damper," and where "damper" is deficient, perhaps may afford a traveller a hint.

Chocolate exhibits, according to its mode of manufacture, a variable amount of the alkaloid, allied to that in tea and coffee, theobromine. It is, however, under all circumstances, much inferior to them in respect of this constituent. The fat, the butter, the starch, and the albumen, which it contains, may be obtained cheaper and more digestible in another shape. It is a luxury for the rich, or an expedient for the invalid, not an economical nutriment. This is sensibly enough felt by our nation, as shown by the custom-house returns. In the year ending January 1st, 1854, while upwards of fifty-eight and a half million pounds of tea, and upwards of thirty-seven million pounds of coffee, paid duty for home consumption, of cocoa not half a million pounds were imported for the same purpose. This, too, is in spite of the much larger quantity of the cocoa bean which is required to make enough for a meal than of the other two.

As respects the use of the three articles in a medical point of view, what has gone before indicates their mode of employment. When we desire to have the fullest physiological effects, with the least bulk, as a temporary medicine, we shall be best suited by strong infusion of tea; for in that the essential oil, which is shown before to be more energetic than the alkaloid, is predominant. If we would wish to choose as a daily drink that which is the most powerful of ordinary beverages, we may

* Bell's Travels, in Pinkerton's quarto collection, vol. vii. p. 358.

take coffee of the consistency it usually is. If we aim at a less vigorous action, it is afforded in tea made weak, according to the customary method. If this is too violent for the patient, and at the same time he rebels against plain water, we may compound the matter by getting him to take thin chocolate.

We may also learn from the observed physiological actions to simplify very much the indications and contra-indications of the use of this class of beverages by the sick. Where, for instance, we would limit the loss of substance, as in consumptions, colliquative diseases, the emaciation of fevers, &c., the accessory drinks are most valuable; they will, in acute cases, save a life which hangs on a thread, in chronic cases prolong the days to an almost indefinite period. In persons who have no disorder admitting of nomenclature, but who are what they call "poor creatures," that is to say, unequal to ordinary exertion of mind or body without an exhausting loss of substance, an useless existence is often by these means made into real life.* The pathology of these cases, probably, is some incapability of taking up by absorption, or of making into blood, or of fixing in the solid tissues sufficient nutriment to supply the waste. They are, therefore, always on insufficient diet, however much they put down their throats. The obvious indication, then, is to limit the waste by some such means as the accessory foods. When, too, the nervous energy is sluggish, the circulation weak and slow, each may, by their cautious employment, be rendered normal. It is not necessary to quote instances of these facts, they are familiar to all as exemplified in the medical use of alcohol, but the same will also be found true of tea and its colleagues, in a minor degree, if we observe their actions. Of all, the great physical effect is to limit destructive absorption, increase nervous energy, and give mental pleasure. With equal clearness the contra-indications are pointed at by the experiments which have been detailed. When it is desirable that secretion should go on quicker, that destructive absorption should be encouraged for a shorter or longer period, then we must forbid accessory foods to a greater or less extent. In the hypertrophic temperament they are noxious; the present author has long been in the habit of forbidding tea, as well as alcohol, to obese persons with striking advantage, and he thinks that good effect has followed its disuse in cases of thickened heart in muscular subjects, though of course the last result is difficult to trace. In gouty constitutions the whole class disagrees to a greater or less extent. Fermented liquids are pretty generally, in the present day, cautiously used by such patients, without our advice; but they are not aware of the objections which may lie against tea and coffee, and the chance of cure by giving them up. A temperate barrister, a college friend of the author's, of a gouty family, used to endure a martyrdom from acid eructations and vomiting, with gastrodynia, &c., till he adhered to cold water instead of tea, coffee, or chocolate at breakfast, when his symptoms ceased. In certain skin diseases, which appear to persist from defect of destructive absorption, water-drinking is often a most salutary temporary measure; when the nervous system is too sensitive, when the circulation too

* What shall be said of diabetes? The decided arrest of emaciation which the writer has several times seen result from the use of bottled porter, in spite of the sugar in it, strongly inclines him to favour accessory drinks in that disease.

excited, tea and alcohol are equally injurious, and, *cæteris paribus*, should be abstained from. In fact, so many cases are benefitted, that the homœopaths and hydropathists, whose whole secret lies in a combination of abstinence from accessory foods with mental amusement, are able to vaunt their systems as an universal panacea. By the simple process of lying, wilfully or ignorantly, they succeed in easily overcoming a difficulty which gives us much trouble; they gladden the patient's heart, by inducing him to have faith in a panacea, and enjoy himself in the country, at the same time as they augment the destructive assimilation in the body. If we keep this in mind, we may usually succeed in attaining the same object in an honest way: but it requires much thought and contrivance on our part, and good sense on the part of the patient. The difficulty is obvious enough—a vast number of cases of disease exhibit deficient nervous energy at the same time as they require an augmentation of destructive secretion, and *vice versâ*, augmented excitability of nerve while the destruction demands arrest. Now, as the remedial discipline of accessory foods, or abstinence from them, combine the qualities in a *transverse* manner (that is, limited destruction and augmented nervous excitement, or augmented destruction and depression of nerve power), a very complex management of purely physical agents becomes necessary to make them beneficial. But why should we confine ourselves to purely physical agents? Why should not the mind be made to reciprocate the many benefits it receives from its slave? Why should not the joys of an easy sociable life in a beautiful country, new faces, shady woods and mountain breezes, be made available to rational medicine as well as to empiricism? It is certain that a "rational establishment," would in the end answer as well as a "homœopathic," or "hydropathic establishment," and the undertaking may be conscientiously recommended to our speculative friends, who can obtain a good site at a moderate rent.

It is to be feared that the accessory articles of whose intimate relation to nutrition we have any practical knowledge is now exhausted. There are many others concerning which, as physicians, we would gladly be able to give a rational opinion, but, unfortunately, we have been able to investigate only the worst side, and learn the mischief which they do—

> "Their evil manners live in brass; their virtues
> We write in water."

Yet is it reasonable to suppose, that unless they do harm, pepper, spices, ætherial flavours, &c. are simply indifferent? Is all the tobacco burnt in England, at the expense of six millions sterling a year, pure waste? Surely the universal propensity of our race to these articles should lead us to conclude that there is an use as well as an abuse. To find dyspepsia arising from over much spice, or the salivary secretion vitiated, and the nerves shaken by excessive smoking, is easy enough; but we wait for a series of experiments on them like those above related on tea and coffee, to know what happens to those who take them and do *not* suffer.

It would be also very desirable to know more of proposed substitutes for customary beverages. Chicorée may be justly set down, even on present information, as no substitute at all, but a cheat and adulteration. It has none of the beneficial effects of coffee. But a considerable interest

attaches to the recent introduction from Sumatra of the roasted leaf of the coffee plant, instead of the bean. The author must confess that he finds it nasty, resembling tea made in a coffee-pot, and wanting in "bouquet;" but that may arise from its over-drying. The great reason for encouraging its importation is the low price, said to be capable of being reduced to twopence a pound, and that it can be grown in a climate where the bean will not ripen. This would, indeed, be a boon to the labouring man, *if the article is worth having at all;* which, in fact, is the gist of the whole question, and can be decided only by experience finally, though, in defect of that, chemical analysis is not devoid of value.

Now it appears from the analysis of Dr. Stenhouse, that the Sumatra coffee leaves are very rich in the desirable alkaloid, and that the same substance is also contained largely in the leaves of the *Ilex paraguayensis*, or Paraguay tea. They contain, in fact, more than the coffee berry, though not so much as the Chinese leaf. The proportions are as follows:

Good black tea	contains	of thein from	2 to 2·13	per cent.
Coffee leaves	,,	,,	1·15 to 1·25	,,
Paraguay tea	,,	,,	1·1 to 1·23	,,
Coffee berry	,,	,,	a mean of 1	,,

These Sumatra leaves contain, also, more soluble substance than the beans, in the ratio of 38·8 to 29·1 per cent. The taste and the quantity of essential oil depend probably on the mode of preparation, which evidently requires improvement. At all events, we have here offered a chance of cheapening a most valuable article of diet without any cheating or adulteration, and probable a great boon to society.

Speaking of cheap teas for the poor leads us to expensive teas for the rich. There is no reason why we should so obstinately adhere to our coarse black leaf, when we can well afford the delicious "padre-souchong," scented with gardenia, or the "hyson-pekoe," made from the young buds, or the yellow teas drunk by wealthy mandarins. These would do away with the necessity for milk and sugar, and so avoid one of the fertilest sources of complaint to the dyspeptic. Let us demand them, and we shall soon get them.

A question may naturally occur to a cautious man, willing to know the real merits and demerits of accessory foods, whether, allowing immediate good results, we may not expect the accumulation of postponed evil to come upon us in the end? A man may feel himself stronger, and grow heavier for a week or a month, but does not some indefinite disease, or shortening of life, at last repay him with interest? A book lately had a considerable sale, writ by an unfortunate man, who traced all the evils to which flesh is subject to the use of salt: to tea has been ascribed all the imaginary degeneracy of the nineteenth century: the rational motives which led to the temperance movement have been overlaid by the illogical theories of teetotallers, denouncing all fermented drinks: tobacco, again, has been so "counter-blasted" by royal and other pens, that one might imagine smoking had only to be stopped to free the world from half its miseries. It is very difficult to prove to the million a negative to statements like these. The experience of medical men and physiologists, however, will probably lead them, on reflection, to assent to a proposition

which is in fact the contrary—viz., that where, on close observation, no immediate pathological phenomena are found to occur, no future organic injury is to be apprehended. An opponent might perhaps point to an old gin-drinker, with his liver hardened, and his gastric glands degenerated, and ask whether he felt the worse after each glass of spirits? This is a very case in point; perhaps the man's own sensations were so blunt and unnatural that he did *not* feel the worse, but if you could have looked into his stomach, as Dr. Beaumont did into Alexis St. Martin's, you would have seen what all the world knows was there visible after each excess. All that is required is close observation by competent physiologists, and there is no doubt but we should find, after each exposure of the body to that which is in the end hurtful, some decided abnormal phenomena, not less marked than the state of St. Martin's stomach, if we knew where to look for it. Before, then, we condemn any habit, we will demand to see bad effects from individual indulgences in it.

It is desirable, before concluding, to make a few remarks on the essential difference between temperate enjoyment and excess. The results of the one are not, for practical purposes, minor degrees of the other: physically speaking, indeed, they are so, but not in the sense in which the argument is ordinarily urged. It is true that the sense of satisfaction which follows a mouthful of wine is excited in the same way as the maniacal raving of the drunkard; so, too, the luxurious glow experienced on rising from a cold bath is of the same nature as erysipelas, or the scald of boiling water. In the latter case, one distinguishes in a moment the normal and abnormal, and so we should act in the former also. Language is not sufficiently perfect to define what is meant by "health," but, if we consult our common sense, we all know; and applying our knowledge to the present case, we may say, that following an instinct* is not an excess, when a man is, after it, as capable as usual of doing his duty, and has no unhealthy state of body.

Some apology is due to Drs. Donders and Moleschott for the sparing notice taken of the two works placed at the head of our list. This has arisen not from any blindness to their merits. They are, in truth, very valuable little popular treatises, such as it would be gratifying to have more common. There is nothing so much prevents the assignment of that honour and influence to the medical profession which it justly deserves, as the ignorance of educated people on all points connected with its most intellectual parts. A knowledge of the principles of law and of theology is forced upon every one who wishes to occupy a certain position in society; but that physiology is a science requiring a high tone of intellect, still more that it is a science necessary to those whom he is acquainted with principally as bill-makers and fee-takers, may be utterly unknown to him. Such books as these introduced into our railway literature would do much to dissipate the state of darkness. A tone of addressing the public, genial, easy, and manly, without affectation, and, still more, without childishness, will soon win their hearts and brains to know us

* It is surely not wrong to call the inclination to alcoholic drinks an "instinct," when we see the difficulty of forging chains sufficiently strong to restrain men from them. The editor of the 'Band of Hope Review' states, that of 500,000 in the United States who had taken the solemn vow of abstinence, 350,000 broke it—an awful outburst of nature! Have the same proportion ever broken vows of chastity or any other solemn obligation?

and love us better. It is pleasant to see a step made in the right direction by the cheap republication of 'Hufeland's Art of Prolonging Life,' by Mr. E. Wilson, and in 'Johnston's Chemistry of Common Life,' an excellent work, in spite of a little affectation in the titles of the chapters; and it may be hoped that translations of Dr. Donders and Dr. Moleschott will follow.

T. K. Chambers.

REVIEW XII.

1. *Die Speck oder Cholestrinkrankheit.* Vom Prosector H. MECKEL. ('Annalen des Charité Krankenhauses zu Berlin.' Vierter Jahrgang, Heft 2, s. 264.)

The Lardaceous or Cholesterine Disease. By Dr. MECKEL.

2. *On some Points in the Pathology of the Liver.* By W. T. GAIRDNER, M.D. *With Seven Analyses.* By Dr. JAMES DRUMMOND. ('Monthly Journal,' May, 1854.)

THE German term "speckig," which literally means bacon-like, has been usually translated into English by the word lardaceous, derived immediately from the French, *lard,* and remotely from the Latin, *laridum, lardum.* The disease in which a bacon-like or lardaceous infiltration of organs occurs has now received from Dr. Meckel another appellation—viz., the cholesterine affection. The propriety or otherwise of this term will appear in the sequel.

The lardaceous disease of the liver was described by Portal and Abercrombie as an albuminous infiltration; by others it was looked upon as a disease of fatty nature; and lately, Budd, referring especially to its presumed causality, has described it as the "scrofulous liver."

Rokitansky (1842) first described with sufficient detail the lardaceous infiltration of the kidney, and made of it his eighth form of Bright's disease. Hodgkin, and subsequently Rokitansky, described the lardaceous spleen, and the latter pathologist attempted to show that the cause of the disease of these three organs was a deep-seated cachexia, the profounder features of which, as far as the blood was concerned, remained to be investigated. Rokitansky made no chemical examination of the infiltrated material, but appears to have assumed that it was of albuminous nature.

We need not refer to the later opinions of Oppolzer, who used the term colloid; or of Baron, who termed the disease "carnification-dyscrasia;" or of Engel, who ranged it under the head of true hypertrophies; or of many of our own countrymen, who have employed the epithet "waxy" to designate this peculiar condition. It is sufficient to observe, that the lardaceous infiltration of the liver, spleen, and kidneys, has been recognised of late years, with greater or less precision, by most writers.

A remarkable interest has been lately given to the microscopic examination of the infiltrated matter in this affection by the statement of Virchow, that the enlarged Malpighian follicles in the lardaceous spleen are composed of a substance which gives the chemical reactions of cellulose. We have, in a later review, given a summary of Virchow's opinions, and have there, also, referred to the paper by Meckel which is now before us.

Our present object is to analyze this paper at greater length, as the statements made in it are of very great interest.

The *coarser physical characters* of the lardaceous liver, spleen, and kidneys are so thoroughly detailed in the works of Rokitansky and others, that we need not delay on this point.

The chief progress which has been made by Meckel is in the *chemical* examination of this infiltrated matter. A fresh lardaceous liver, spleen, or kidney yields to hot or boiling water a large quantity of a substance which has an acid reaction, is tasteless, and is soluble in water, with which it can be made to froth; it does not pass over when distilled with water; it does not hinder albuminous solutions from passing through membranes saturated with it; caustic potash makes its solution clearer; hydrochloric acid decomposes it, and brings into view fat drops, which form on the surface.

The lardaceous organ yields to cold alcohol a yellow-brown crystalline oily pulp; to hot alcohol a larger quantity of similar substance. Ether extracts a small quantity of similar substance. Meckel considers this substance to be a *soap*, a combination of bases (the exact nature of which he leaves undetermined), with an excess of fatty acid.

When the solution is evaporated, the following *microscopic* appearances are seen. It should be mentioned that there is never any polarization of the light (absence of sugar):

1. Pure, almost colourless oil-drops, coloured yellow or brown by iodine, then made darker by sulphuric acid, without any play of colour.

2. Similar oil-drops, made of a *dark blue-green colour* by iodine and sulphuric acid.

3. Oil-drops, simple, or in concentric layers, coloured at first *beautifully violet*, then blue, then dark-brown, by iodine and sulphuric acid.

4. Aggregated nodules and various extraordinary forms of a colourless fat, partly in extremely fine stratified drops, partly in long stratified, straight, or winding cylinders, with double outlines, exactly like nerve-tubes; partly appearing as simple drops, with, perhaps, enclosed *water-drops and crystals.* All these are scarcely coloured by iodine, and are rendered by *sulphuric acid entirely colourless.*

5. Needle-form crystals, single and in bundles, not coloured by iodine; rendered by sulphuric acid beautifully blue and green.

6. Cholesterine crystals, not coloured directly by iodine, but exhibiting after the application of iodine and of sulphuric acid a beautiful play of colours, first violet, then for days indigo and cærulean blue, then later a beautiful emerald green.

Such a chaos of substances is indicated in these reactions, that a perfect isolation and description of them is not at present to be hoped for; but Meckel believes that the reactions with iodine and sulphuric acid of the fresh organ, and not of the extract, are sufficiently precise to enable us to distinguish at least four substances, which he calls the "speck-roth, speck-violet, cholesterin, and speck-kalk." The literal translation of these terms would be *bacon-red, bacon-violet, cholesterine,* and *bacon-chalk!* but as the genius of our language is little adapted for the translation of such Germanisms, we shall not attempt to render them literally.

1. The lardaceous substance, which gives the *red* reaction (speck-roth), is the most abundant and widest spread. It is colourless, semi-trans-

parent, and, when in large quantity, presents the appearance of a jelly-like firm grey infiltration, without evident oil-drops. It is, according to Meckel,* a peculiar double body, composed of coagulated albumen and a fat. This substance can be always recognised by the simple iodine reaction, which gives a yellow-red colour, distinct from the violet-red of dextrin.

2. The lardaceous substance with the violet reaction (speck-violet) is a firmer, denser substance, in much smaller quantity than the former. It is probably a combination of cholesterine and other fats. It seems to occur in the normal state in the "corpora amylacea." In disease it is often found in the little arteries, especially in the Malpighian bodies in the lardaceous kidney. To produce the violet reaction, sulphuric acid must be added after the iodine.

3. Pure isolated cholesterine is seldom found in lardaceous exudation. It is present without the two former substances in the large arteries of those affected with lardaceous disease. Meckel found it once with the substance with red reaction (speck-roth) in the cerebral vessels of a lunatic.

4. The lardaceous substance with calcareous matter is found only in the kidney, and here only in small quantity. It is greatest in quantity in the Malpighian corpuscles.

The exact nature of the peculiar fat which plays so important a part in the composition of all these compounds is unknown. No other fat shows this reaction with iodine. The author thinks it cannot be related to starch and dextrine. The common kinds of fat form, he suggests, the basis of the lardaceous fat, and then, through the influence of bases, peculiar changes occur, which at first produce soaps of ammonia and other alkalies, and end at last in the production of cholesterine, and of compounds of chalk with the lardaceous exudation.

After attempting to define to some extent the chemical nature of this peculiar exudation, Meckel enters upon the consideration of the lardaceous disease in general. This affection has as yet been recognised only in the dead-house, and chiefly in persons who have suffered from some profound chronic malady, such as syphilis with mercurial cachexia, scrofulo-rachitic affection with or without abscesses, or lung and intestine-tuberculosis. The relation between the general lardaceous disease and tuberculosis is discussed at some length, but we shall pass over this, in order to come to the more positive and interesting points connected with the development of the disease.

Meckel believes that there is a peculiar blood-dyscrasia; he does not imply by this term that the special lardaceous material is found in the blood, but that the blood contains some substances (fat, chalk, &c.), which may form in certain tissues abnormal compounds with some of the normal ingredients of those tissues.

In the dyscrasia leading to this disease all fatty tissues may receive or form the lardaceous material. It is always found in such cases in the system of the smallest arteries and walls of the capillaries. It is, however, never found in the arteries of the bones, and very seldom in those of the brain. The arteries of the stomach seldom contain much, those of the duodenum a great deal. In commencing lardaceous disease of the spleen it is the arteries which first suffer. In the kidneys the disease

also attacks the arteries first, and especially the arteriæ afferens et efferens of the glomeruli, and the coil itself.*

The veins have never given evidence of lardaceous disease.

The thyroid gland is seldom affected. The heart is usually not involved, or rather is not lardaceous. No lardaceous deposit has ever been found in the lungs by this author.

The *spleen* in the lardaceous affection is *never* free from disease, although in some cases nothing may be apparent to the unassisted eye. The arterial capillaries are lardaceous, and sometimes have little lateral bulgings (ektasis), especially when in connexion with the Malpighian corpuscles. These bodies contain at first normal splenic corpuscles; at a later stage some irregular granular jelly-like lymph corpuscles appear between them, which are infiltrated with the substance giving the red reaction; then little masses of lardaceous substance appear. These masses increase, so that the spleen in advanced cases is enlarged, and on section the grey, hard, lardaceous, Malpighian bodies are visible to the naked eye. In the most developed stage of the disease the whole spleen is lardaceous.

Slight lardaceous disease of the *liver* begins with the appearance of the substance with the red reaction, probably in the cells. The reaction of iodine distinguishes at once every lardaceous cell from every bile or fatty one, if such be present. The substance with violet reaction is rare. The lardaceous liver is usually, but not always, enlarged. The bile appears rich in cholesterine, and gall-stones are common, and once Meckel found the lardaceous substance in the bile. There is no icterus. The liver was affected in 8 of 11 cases recorded by the author.†

The lardaceous affection of the intestinal canal is very interesting; in some cases there is inflammation with fibrinous exudation on the mucous membrane, and in this exudation lardaceous substance is found; on examining the membrane itself, the points of the villi, then the villi altogether, then the whole membrane are found infiltrated with the lardaceous substance, giving the red reaction, while in the non-inflamed parts of the intestine nothing of the kind is found. The inflammation assumes sometimes the shape of rings. In other cases the lardaceous matter is infiltrated into the solitary and Peyerian glands.

The *kidneys* are only affected in general lardaceous disease. It commences, as already said, in the vessels of the glomeruli, but the lardaceous substance does not appear to prevent entirely the passage of water or of albumen. From the Malpighian bodies the deposit passes into the entering and efferent vessels, then into the membrane of the tubes, and then more or less through the whole organ. The vessels are much thickened, and Meckel conjectures that Dr. George Johnson referred to this con-

* Meckel observes in reference to this, that there are few examples which show any relation between dyscrasia, medicines, and poisons, and the Malpighian corpuscles, whereas there occurs especially in them icteric, fatty, and chalky depositions. He alludes, however, to the case of an epileptic patient treated with nitrate of silver for a long time, whose renal Malpighian bodies showed after death a dark blue-black colour, which was found to depend on the infiltration of their walls with a pigment which contained silver.

† Frerichs (Wien Med. Wochenschrift, vi. 1854, and Schmidt's Jahrb., Band lxxxiii. p. 5) relates a case of lardaceous liver in a girl aged nine years. There was attendant ascites; and on paracentesis being performed, a large quantity of sugar was found in the fluid. With the exception of cases of diabetes, Frerichs states that sugar has never yet been found in ascitic fluid, and suggests that its presence may be a diagnostic sign of lardaceous liver.

dition when he described the thickening of the coats of the vessels in morbus Brightii. The substance giving the red reaction is first seen in the kidney, then more and more of the substance with the violet reaction appears, and, finally, the lardaceous chalk appears.

So much for the pathological anatomy of this affection. As to its symptoms, little is known. The urine is albuminous, and probably the lardaceous substance sometimes appears in it. In 9 of the 11 cases there was anasarca, and the case was in several instances called Bright's disease. Meckel does not describe the microscopical or chemical examination of the urine. The diagnosis of the lardaceous kidney remains then to be discovered. If in the so-called renal dropsy we discover the liver very large, smooth on the surface, and not painful, and if there be scrofulous or suppurative disease of the bones, the diagnosis of lardaceous disease may perhaps be made.

The treatment of this affection is of course quite unknown, but Meckel thinks that in one case potash was useful. He advises, also, that acids (hydrochloric and sulphuric) should be tried.

We have given a pretty full analysis of this paper, and we refrain at present from doing anything more. If it really appear that the so-called lardaceous substance is, within certain limits, a stable chemical compound,—and if it can be so easily distinguished by the test with iodine and sulphuric acid,—a new path of great interest is opened for pathologists. We must confess, however, that Meckel's chemistry appears to us rather rude and unsatisfactory, and we are not at all convinced that he has made out the propriety of the term "cholesterine disease." Still our previous knowledge of the lardaceous affection leads us to think that many of his facts are correct, and some observations made in this country lend, we think, considerable support to some of his views.

We refer to some interesting remarks by Drs. Gairdner and Sanders on the "waxy liver, spleen, and kidneys," in the 'Monthly Journal' for February of the present year (page 186). Without being acquainted, apparently, with the peculiar reaction mentioned by Meckel, Dr. Gairdner has evidently come to very much the same conclusion. He observes that the waxy (lardaceous) degeneration of the kidney constitutes one form of Bright's disease, and that it is particularly *the arteries and the Malpighian tufts which are first affected.* In the spleen the Malpighian bodies are most affected. The important observation is also made, that both tubercle and cancer can, like the normal organs, undergo this degeneration. In the same journal, Dr. Sanders observes that the waxy (lardaceous) spleen is very common (in 10 per cent. of all the bodies examined in the Royal Infirmary at Edinburgh), and that the substance in the Malpighian bodies has both peculiar physical and chemical characters: it is a dense, colourless, translucent, homogeneous substance, with traces of irregular, misshapen cell-forms; it is little acted on by the usual reagents (acids, alkalies, alcohol), and is coloured brown by chromic acid and iodine. On this subject we would refer also to a former page (p. 347).

Drs. Gairdner and Sanders think that the waxy conditions of the spleen, liver, and kidneys, are dependent on the same disease—viz., a peculiar alteration in the nutrition of the textures, which is probably caused by an altered condition of the blood.

"The most interesting point of the pathological relations, is the fact that the waxy conditions of the liver and kidney depend upon the same change as that which takes place in the spleen. On this point Dr. Gairdner and Dr. Sanders had made repeated examinations. In the advanced stage, many of the acini of the liver, the Malpighian bodies, and other parts of the kidney, have undergone alteration into this transparent substance, which exhibits under the microscope the same physical, and, so far as tested, the same chemical characters as in the spleen. We must therefore class these conditions of the liver, kidney, and spleen together, as being similar not only in outward aspect but in the real nature of the affection. It is also apparent that the waxy lesion does not depend on fatty degeneration, for the fatty condition of the spleen is not met with; nor upon mere increased growth and compression of the cells, because the bloodvessels are also affected; but it depends on a peculiar alteration in the nutrition of the textures, and as it generally occurs simultaneously in several organs, it must arise from deep-seated constitutional causes, and may very probably be connected with an altered condition of the blood." (p. 188.)

We need scarcely say how closely these statements accord with those of Meckel.

The paper by Drs. Gairdner and Drummond gives us some important facts connected with the chemical examination of diseased livers. The following table by Dr. Gairdner shows at a glance its conclusions:

Empirical formulæ, representing the chemical constitution of the entire liver (male), in health, and in various pathological conditions (avoirdupois weight).

	Normal liver.		Fatty liver.		Waxy liver.		Cirrhosis with hypertrophy.		Cirrhosis with atrophy.	
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
Water	3	0	2	8	3	6½	4	2	1	6
Solids	0	15	1	0	2	0	1	3	0	7½
Fat	0	1	1	8	0	2½	0	5	0	2½
Total weight	4	0	5	0	5	9	5	10	2	0

Of course it is understood that this table does not give the exact results of the analyses, but merely what Dr. Gairdner calculates from the experiments already made will be found to be the composition of liver in the various pathological states above-mentioned.

Dr. Gairdner considers the waxy liver to be the most common of all the forms of diseased liver in phthisis; to be, in fact, far more common than the fatty liver, with which the waxy liver is often confounded at the present day as it was by Louis. We may observe on this point, that occasionally the microscope may lead to a diagnosis of fatty liver, when no, or but little, fat can be extracted by ether. In two livers, which under the microscope presented numerous round highly refracting fatty-like globules, which were pronounced to be fat by very capable observers, we found the following composition in 100 parts, which we have compared with two analyses of healthy liver by Dr. Beale.

	Healthy liver (Beale).	Healthy liver (Beale).	Presumed fatty liver.	Presumed fatty liver.
Water	68·58	72·05	75·28	76·41
Solids	31·42	27·95	24·72	23·59
Fat	3·82	4·28	3·39	0·00
Fat in 100 parts of solid matter	12·15	15·31	13·71	0·00

In the analysis of the last specimen (which was said by an experienced

microscopist to be highly fatty) not a trace of fat was taken up by boiling in ether several times, nor did ether act on the globules under the microscope. We did not determine the exact nature of the infiltration which thus simulated fat, but from some of the chemical reactions it was presumed to be of an albuminoid nature, and to be allied to the lardaceous liver. The disease in the first pâtient had been diagnosed during life as morbus Brightii; the second case was in a young woman with tuberculous pneumonia, in whom there was enlargement of the liver, the spleen, and the kidneys, with albuminous urine.

We shall for the present quit this subject, with the remark, that both the German and the Scotch observers, whose papers we have noticed, appear to have pursued their inquiries with complete independence.

E. A. Parkes.

REVIEW XIII.

1. *A Treatise on Diseases of the Heart.* By O'B. BELLINGHAM, M.D., F.R.C.S.—*Dublin*, 1853. pp. 252.
2. *The Diseases of the Heart and the Aorta.* By WILLIAM STOKES, Regius Professor of Physic in the University of Dublin.—*Dublin*, 1854. pp. 689.

(*Concluded from No. 27, page 20.*)

HAVING discussed in our former review the subject of pericarditis, we shall now consider the subject of endocarditis.

According to Dr. Stokes, the general formula for the detection of endocarditis is the occurrence of symptoms of cardiac irritation, accompanied by signs of valvular lesion. The disease, he states, may be associated with pericarditis, may come on insidiously in the course of rheumatic fever, or may occur in a case where the heart has been previously diseased. Dr. Stokes does not include Bright's disease among the causes of endocarditis. From the evidence of post-mortem examination that disease is its most frequent cause. Thus, Dr. Chambers relates, in the 'Decennium Pathologicum,' that out of 43 cases of endocarditis, 12 were associated with Bright's disease, 9 with acute rheumatism; and Dr. Barclay found Bright's disease in 9 out of 21 cases in which there was fibrinous deposit on the valves, in 8 of the cases there was valvular disease associated with previous attacks of acute rheumatism, and in 1 only with an existing attack.

"If we admit that the valves are more prone to inflammation than the membrane lining the cavities, we are forced to inquire, what are the circumstances which cause this difference. The structure of the valves, so far as we know, does not differ from that of the endocardium, generally considered. This at least is true of the auriculo-ventricular valves; but when we consider the anatomical relations of the membrane, we find that the endocardium of the cavities is in contact with the red muscular tissue, while that of the valves is a free serous structure. This, while it would not explain the greater liability to disease of the valves, might throw some light on the frequency of their chronic disorganizations." (p. 101.)

We would suggest that the margins of the valve are peculiarly prone to endocarditis, owing to the mutual friction of those edges upon each other. The mitral and aortic valve were both affected in 21 of the 43

cases enumerated by Dr. Chambers; in 14 of the rest the mitral, and in 7 the aortic valves were alone affected. The preference of the disease for the mitral valves is probably due to the forcible strain which is made upon them by their fleshy columns.

Dr. Stokes well remarks that:

"The symptoms of endocarditis are not yet fully ascertained or defined, and it is doubtful whether its diagnosis will ever be established with the same accuracy as that of pericarditis. Many circumstances occur to make this diagnosis difficult. Of these we may specify, first, the rarity of the disease in an uncomplicated form; second, the frequent co-existence of pericarditis; and thirdly, the general similarity of its constitutional symptoms with those of the latter disease. In truth, we rarely meet with a case of simple idiopathic endocarditis fit to be considered as a type of the signs and symptoms of the disease. Such a case at least has never occurred to me. . . . . .

"Like pericarditis, this affection is often latent, causing little or no distress to the patient, no irregularity of the heart, nor any other symptom of irritation. This frequently occurs in rheumatic fever, and the practitioner is often surprised by his patient showing symptoms of valvular disease after an apparently perfect recovery from the fever. Latent endocarditis may thus exist, and the disease be only recognised when it is no longer curable." (p. 102.)

There is, in fact, no difference in character between the murmur of endocarditis and that of established valvular disease. How is it possible to tell whether the sound heard be due to an old standing or to a newly awakened disease, unless the murmur be generated for the first time while we are watching the patient from day to day? Even then the murmur is not an absolute proof of endocarditis, since even a mitral, and still more often an aortic murmur, may be generated when there is no valvular disease. This has been noticed by Dr. Stokes in two cases where it was removed by the act of vomiting, and in several cases of fever; by ourselves in a case of fatty degeneration; by Dr. Graves in a case of pericardial adhesion;* by Dr. Barclay, Dr. Markham, Dr. Chambers, and Dr. W. T. Gairdner, in cases in which no trace of valve disease was observed after death. Dr. W. T. Gairdner has recently made some excellent communications on this subject, which have been noticed in the 'Edinburgh Monthly Journal.' In a patient under our own care, in St. Mary's, we heard one day a loud musical mitral murmur, which next day had totally disappeared. In another patient, in whom the heart-sounds were normal, a plaintive, musical, mitral murmur was excited by exercise; he could also induce this by pressing on the abdomen, when he sat with his feet on the fender, after which it disappeared when he stood up. In anæmic persons mitral murmur is occasionally audible. The researches of Mr. King proved that the tricuspid valve enjoys a safety valve function—we are convinced that the mitral valve is endowed with a similar power. Were it not so, the left cavity would be more frequently exposed to rupture than it is when the capillaries are obstructed under the influence of terror. When examining the movements of the heart in an ass under the influence of wourali, we compressed the aorta—the left ventricle was filled *a tergo*, but was not distended. If the muscular columns be paralyzed from inflammation, mitral regurgitation may take place. The so-called anæmic mitral murmurs are undoubtedly produced by actual regurgitation. It is probable that in such

* Clinical Medicine, vol. ii. p. 167.

cases, and especially in chorea, the blood circulating in the heart is not sufficiently stimulating to excite the due degree of contraction in the fleshy columns.

If a mitral or aortic murmur supervene while a case of acute rheumatism is being watched, especially if there be congestion and an expression of anxiety in the face, with distress in the region of the heart not caused by pericarditis, there is strong probability of endocarditis; but if, when we are called to a case, we find a murmur, we are not entitled at once to infer acute endocarditis, and to treat the patient accordingly, owing to the mere presence of such murmur. If the patient have had a previous attack of acute rheumatism, accompanied by chest-signs, and followed by breathlessness on ascending a hill, the *bruit* is most probably due to valvular disease, established during the previous attack. No mistake can be practically more mischievous than this, especially if it be made by one accustomed to rush to calomel and large leeching to arrest the inflammation.

The detection of endocardial murmurs. supervening, as they often do, during pericarditis, though easy enough on paper, is most difficult in practice. Over the region of the heart itself, the grazing sounds altogether mask the valve murmurs. These must, therefore, be looked for from da to day, beyond the region of the heart. The systolic mitral murmur is not so difficult of detection, seeing that it is usually heard with increasing intensity and smoothness beyond the apex, and especially beyond and just above the nipple. If such a sound extend an inch and a half beyond the nipple, it is certainly due to mitral regurgitation, since, according to Dr. Stokes's law, friction-sounds are limited to the heart's region. Should it be otherwise, they are, speaking from our own experience, of a harsh grazing character; if so it would be scarcely possible to discern the mitral murmur, unless audible behind. The detection of an aortic murmur during pericarditis is much more difficult. The *frottement* often mounts to the top of the sternum. The aortic murmurs can therefore only then be distinguished in the neck. The best point for examination is just above the sternum, a little to the right, just over the innominata. If the sound be simply systolic, it may be caused by the suddenness and energy of the heart's action, propelling forth the blood of anæmia; it may also be easily caused by the pressure of the stethoscope, or the irregular contraction of the sterno-cleido muscles. If the first sound be followed by a distinct clear second sound, the chances are that there is no affection of the aortic valves, even if there be a loud systolic murmur. If, however, the second sound be indistinct, inaudible, or prolonged, or replaced by a diastolic bruit, the aortic endocarditis may be suspected, or detected with increasing precision. Care must be taken that vein murmurs, from pressure, are not mistaken for valve-murmurs. He must be rash that will decide this question on a first examination.

Dr. Latham and Dr. Hope are of opinion that endocarditis is more frequent than pericarditis. Dr. Stokes has come to a different conclusion, and to this conclusion we hold. If we decide the question by counting up the number of cases of acute rheumatism in which we have valve-murmurs, and set them over against the number in which we have friction-murmurs, no doubt the valve-murmurs predominate. The fallacy of such

a method is well shown by Dr. Stokes, and has been already sufficiently illustrated. Let us, then, take the evidence of post-mortem inquiry. Dr. Chambers found that there were 135 cases, or six per cent., of pericarditis, and 43, or two per cent., of endocarditis, in 2161 bodies—9 of the latter, and 19 of the former, were associated with acute rheumatism; and 12 of the latter, and 36 of the former, with Bright's disease. According to this return, pericarditis is twice as frequent as endocarditis in acute rheumatism, and three times as frequent in Bright's disease. Dr. Barclay* found that in 8 fatal cases of acute rheumatism, 6 had pericarditis, 3 endocarditis, and 2 no cardiac inflammation; and that in 13 fatal cases of Bright's disease affected with endocarditis, or pericarditis, or both, 6 had the former, and 9 the latter. Dr. Taylor observed that in 17 cases of pericarditis examined post-mortem, only 3 were likewise affected with endocarditis. So far, then, as the test of the dead-house is concerned, pericarditis is a much more frequent disease than endocarditis. It may be, however, that endocarditis is a less fatal disease during the attack than pericarditis.

Endocarditis, or at least the deposit of fibrine, is proved to affect the valves when they are already diseased. Thus, Dr. Barclay found, that 13 out of 21 cases in which fibrine was deposited on the valves, were affected with old standing valvular disease. Dr. Stokes gives a valuable case of this class in which, though there was ossification of the mitral valve, there was no murmur; but the supervention of endocarditis developed a loud murmur with the first sound. If in a case of valvular disease, the murmur becomes suddenly louder, harsher, or more musical, there is some reason to suspect the supervention of endocarditis, or the deposit of fibrine on the valve.

Dr. Stokes gives three cases of supposed endocarditis in which there was doubling of the second sound. We would suggest that this is due to the fact that one of the ventricles expels its contents sooner than the other, probably owing to local irritation, and the blood consequently comes back during diastole on the semilunar valves of the side in question, so as to cause a second sound there before the systole of the opposite ventricle is completed. We think with Dr. Walshe, who suggests that they arise from a want of consent between the ventricles, that these reduplications are almost insignificant in diagnosis. Dr. Stokes gives two valuable sections on myo-carditis and on purulent cysts of the heart, to which we refer the reader.

One of the most valuable and important chapters in Dr. Stokes' work is that on the 'Diseases of the Valves of the Heart.' He first considers the causes of the heart's sounds:

"Thus, some have taught that the sounds depended upon valvular tension; some, on muscular contraction; and others, on the impulse produced by the current of blood. But if we reflect on the number of physical circumstances which, if not all concurring to produce the double stroke of the heart, must take place in the short interval of time occupied by each complete action of the organ, indicated by the arterial wave, we shall find that the number of operations or possible causes of sound is very great. We have—1. The auricular contractions; 2. The ventricular dilatations; 3. The ventricular contractions; 4. The auricular dilatations; 5. The opening of the auriculo-ventricular valves; 6. The opening of the arterial valves;

* Medico-Chirurgical Transactions, vol. xxxv. p. 24.

7. The closure of the auriculo-ventricular valves; 8. The closure of the arterial valves; 9. The entrance of blood into two auricles; 10. The entrance of blood into two ventricles; 11. The exit *per saltum* of the blood from two ventricles. So that we have here not less than twenty-two operations, which, however, if the heart is acting with regularity, may be reduced to eleven, in consequence of the simultaneous action of the pulmonary and systemic portions of the heart.

"It is certainly not proved that every one of these operations produces sound. For example, we have no evidence that the relaxation of a hollow muscle is attended with sound. Still, even at the moment of this relaxation, a possible cause of sound exists in the impulse of the blood against the walls of the cavity: as occurs in aneurism from the entrance of the wave of blood into the sac. . . . .

"We have thus, as the principal causes of the acoustic phenomena of the heart's action, three conditions, namely, the contraction of its muscles, the closing of its valves, and the current or wave of blood passing from one cavity into another. These are, at all events, the sources of what may be termed the intrinsic phenomena of the heart's action, and have special reference to the production of the first sound. The second sound, or that produced by the arterial valves, on the other hand, may be termed extrinsic, and has relation to the motion of the blood after its departure from the heart." (p. 128-30.)

We would particularly claim the reader's attention to the large and pregnant truths contained in the following passages:

"It will be seen by referring to the chapter on the condition of the heart in Typhus Fever, that in by far the greater number of cases of alteration or suspension of one of the sounds, that sound was the *first*, and that in many instances so complete was its obliteration, that the double action of the heart appeared suspended, nothing remaining but the second sound. I have suggested, that in the rare cases in which the latter becomes feeble, there is a diminution of the arterial force; but future observations must determine whether this be owing to any alteration of the vital contractility of the vessels, or of their elasticity alone.

"It is, then, in the vital and anatomical conditions of the muscular fibre that we find the key of cardiac pathology; for, no matter what the affection may be, its symptoms mainly depend on the strength or weakness, the irritability or paralysis, the anatomical health or disease of the cardiac muscles. It was long ago observed by Laennec that valvular diseases had but little influence on health when the muscular condition of the heart remained sound, and every day's experience confirms this observation. We may extend it to many other cardiac affections, at least so far as the production of characteristic symptoms is concerned. Pericarditis without irritability of the muscle is often so completely latent as only to be discoverable by physical signs; and the same may, doubtless, be said of endocarditis; while it must never be forgotten that the important symptoms of these affections, as laid down in books, have reference to lesions of either muscular action or structure." (p. 131.)

The above quotations illustrate certain remarkable and apparently contradictory qualities in the mind of Dr. Stokes. The first passage, relative to the great number of possible causes of the heart-sounds, is dictated by a singular subtlety of analysis that continually shows itself in the course of the work, and the last passage is distinguished by breadth and grasp. The minute details are apt to be confusing, but the vigour with which the important points are at length brought out establishes the leading idea in the mind of the reader. These qualities, while they make Dr. Stokes' work of permanent value to every practitioner, his daily labour being occupied, not with the types but with the infinite varieties of disease, often render it difficult and confusing to the student. Farther on, Dr. Stokes gives a large quotation on the causes of the heart's sounds from Skoda's

work. The recent admirable translation of that work by Dr. Markham now places it within the reach of every one. Skoda's view of the nature of those sounds, and of the action of the valves, is, we conceive, in the main, correct, especially in what relates to the office, ascribed by Weber and himself to the fleshy columns which prevent the valves from being drawn out of the ventricles during the systole. In addition to this, however, we would suggest that the mutual movements of the fleshy columns and the walls of the heart are such as to bring the edges of the valves almost into approximation at the very beginning of the systole, and before any fluid has been expelled. If there were no such provision, a considerable quantity of the blood just admitted would regurgitate into the auricle before the blood has time to float together the margins of the valvular flaps, so as to close the aperture. The position of things is very different with the semilunar valves when they commence to act, seeing that when the ventricle has ceased to propel the blood forward, it is still for an instant shut, like the doubled fist, by its rigid walls; consequently, when the elastic force of the arterial walls begins to return the blood back upon the valves, that fluid, incapable of entering the shut ventricle, finds its way at once behind the valves, so as to close them. Indeed, as Dr. Alderson suggested to us, owing to the peristaltic movement of the ventricle, those portions nearest the valves are the last to contract, and consequently, as the ventricle is emptied, the bases of the valves become approximated.

Our space will not allow us to consider in detail the question of the heart's sounds, with regard to which we gladly refer the reader to the lucid and comprehensive details in Dr. Bellingham's work, as well as to Skoda's and Dr. Herbert Davies's valuable writings, and the various original memoirs referred to by those authors. We would, however, remark, that we completely coincide in opinion with Skoda and Dr. Stokes, as to the compound nature of the sounds, as we have previously stated in the 'Provincial Medical Transactions' for 1844. We there insist on the effect of the impulse of the heart upon the walls of the chest, in producing what we term the impulse noise, that being one of the elements of the systolic heart sound, as Skoda long since clearly stated. The impulse noises are only heard over that part of the chest with which the walls of the heart are in contact; they are obliterated by the thinnest wedge of interposed lung; consequently those noises muffle and obscure a valve murmur over the superficial cardiac region, but they cease to do so immediately beyond that region. The mitral murmur is therefore generally much louder and clearer to the left of the apex, than over the apex itself. We found out, almost by accident, that the interposition of a slip of paper between the skin and the stethoscope, applied over the cardiac region, completely obliterates the impulse noises. Any valve murmurs present are thus usually rendered much clearer, owing to the obscuring impulse noises being, as it were, dissected away. Why this is so we cannot tell; the fact itself readily admits of confirmation; and Dr. Todd has already corroborated our observation, in one of his valuable clinical lectures. As the heart's impulse is now before us, we would here protest against a singular error broached by Skoda, who states, from observations made by him on a child devoid of sternum, that the apex of the heart descends *one inch* during systole. This is altogether contrary to the

observations of every experimenter on the movements of the heart. We noticed the heart of an ass under the influence of the wourali, beating with full vigour for four hours, and we found that the descent of the apex during systole was trifling. Gutbrod and Skoda consider that the impulse is caused by the recoil of the ventricle when the blood is being propelled into the arteries, on the principle of the motion of Segner's wheel, Barker's mill, and the rocket. This view was ably put forth and proved by Dr. Alderson, as early as 1825.* Besides this cause, we would suggest that the following additional causes co-operate in producing the impulse. The elongation of the ventricle, owing to its lateral contraction, just as the tongue is protruded; the filling of the auricles behind, and to the right of the respective ventricles during their systole, which displaces the ventricles forward, on the principle of Bramah's hydraulic press; and the tendency to straighten the aorta and pulmonary artery by the rush into them of the blood during systole, as Hunter put forth.

The following remarks by Dr. Stokes are of great value:

"It too often happens, when the existence of a valvular disease is determined, that great labour is expended in ascertaining the exact seat and nature of the affection. Long and careful examinations are made, to determine whether the disease exists at the right or left side of the heart; whether it be a lesion of the mitral, tricuspid, or the semilunar valves; a contraction or dilatation; an ossification; a permanent patency, or warty excrescence. Now, though in some, we might say in many cases, these questions may be resolved with considerable accuracy, it is also true, that in a large number their determination is of comparatively trifling importance; and the two great practical points to be attended to are, first, whether the murmurs really proceed from an organic cause, and next, what is the vital and physical condition of the muscular portions of the heart; for it is upon these points that prognosis and treatment must entirely depend. There is, indeed, no other organ whose affections more fully illustrate the truth of this principle, that in dealing with the diseases of adjacent structures, diagnosis is easy where it is important, and of little value where it is difficult or impossible.

"Another source of the difficulties with which this subject is surrounded is, that rules of diagnosis are in many cases founded on the supposition of the isolation of disease; but every practical man knows, that in chronic diseases of the heart, isolation is the exception, and complication the rule. Hence, one reason why disease at the bedside so rarely corresponds with its description in books. . . . .

"The various effects of organic disease on the function, structure, and form of the valves, is described in every work on pathological anatomy. In a practical point of view, it would be sufficient to recognise contraction or dilatation of the orifices, both of which conditions are attended by a permanently open state. . . . .

"For it appears certain that we must be guided in our treatment of valvular disease less by the condition of the valves, than by that of the muscular portions of the heart. The practical physician, having satisfied himself that a valvular disease exists, will not devote too much time in ascertaining its exact nature; but he will examine into the vital and mechanical state of the heart's cavities. He will ascertain the amount of vigour of the heart, whether its force is above or below the natural standard; whether it is liable to excitement from slight causes; and whether irregularity of action or the opposite is its ordinary state. He will endeavour to determine the duration of the disease and its origin, and examine how far the brain, lungs, or liver, have suffered from the mechanical or vital effects of disease of the heart. Thus he will obtain some rule of treatment, and as the two most common diseases of the orifices—viz., permanent patency of the aortic and mitral valves, when occurring in an isolated form, are not difficult to distinguish, he will, so far as treatment and prognosis are concerned, be able to

* Quarterly Journal of Science, Literature, and Art.

give to the patient all the advantages which the present state of medicine can afford." (pp. 131-135.)

Dr. Stokes then gives a succession of formulæ for the diagnosis of the various valvular diseases of the heart, which, with one exception, do not differ from the received views. That exception relates to extreme ossific disease of the aortic orifice. He has witnessed two or three such cases, in which there was an extremely loud and musical murmur at the aortic orifice, transmitted through the whole extent of the arterial tree.

"In two cases, the sounds were distinctly audible to the patients, who were conscious of their existence at almost every point of the body. With one patient the perception of these sounds was the principal cause of his suffering, for his general health long continued excellent, and the heart's action was but little excited. This gentleman once observed to me, *that his entire body was one humming-top.* The loudness of the tone varied with the force of the heart. When I first saw him, the sounds were audible at the distance of at least three feet; but when the force of the heart had been reduced by local treatment, the use of sedatives, and by removing all causes of bodily and mental excitement, the loudness of the sound at the aortic orifice was so much reduced, as to render it inaudible, unless by applying the ear. Even under these circumstances, the musical sound of the small arteries still continued, though not to such a degree as to cause annoyance to the patient." (p. 139.)

Dr. Stokes remarks, that the complications of heart disease are so numerous and varied, that it is impossible to determine the exact nature of every case that may come before us.

The loudness of the valvular murmur is by no means proportioned to the extent of disease. Indeed, as we have already remarked, aortic, and even mitral murmurs, may be present when there is no valve disease. On the other hand, extensive valve disease may exist without any attendant murmur. Decrease, and even disappearance of a murmur, may coincide with the increase of disease, as is well illustrated by Dr. Stokes, in a case of ossification and contraction of the mitral valves, in which there was complete disappearance of murmur before death; and by Mr. O'Ferrall, in a series of cases illustrative of the disappearance of murmur in progressive valvular disease.* He believes that, with the advance of disease of the valves, the valve may be so altered as to prevent regurgitation, and that hence the regurgitating murmur disappears.

Violent action of the heart may excite murmurs, when both the heart and the blood propelled by it are healthy. The so-called anæmic murmur may be caused by the moderate action of the healthy heart when the blood is watery. Valve diseases which excite murmur may cease to do so, if the action of the heart becomes too feeble or too rapid to generate the sound. The physical conditions causing the murmur may be changed, either by change in the power, the force exercised, or the rapidity of the heart's action; the increase or decrease of water in the blood; and by the ease or difficulty with which the blood flows through the capillaries of the system, or of the lungs.

Perhaps the most valuable section of Dr. Stokes' work is that relating to the latency of chronic valvular disease:

"The doctrine that disease of the valves, when it is uncomplicated with any functional or organic lesion of the muscles of the heart, is often so latent as to be undiscoverable without physical examination, is one of the great truths for which

* Dublin Journal of Medical Science, vol. xxiii.

we are indebted to the genius of Laennec. And it is not yet sufficiently insisted on, that valvular disease, even to an extreme degree, may affect the heart without there being anything in the previous history or existing symptoms which could lead us to suspect the existence of such a lesion. . . . . .

"The effects of injudiciously communicating to the patient that his heart is organically diseased, in conjunction with those of an ignorant and destructive medication, produce that very condition the absence of which has been the patient's chief safety. The heart becomes irritable, irregular, perhaps excited, and it is then no wonder that the *symptoms* of disease are superadded to the *signs*." (pp. 146, 147.)

Dr. Stokes relates, in illustration, the instructive case of a gentleman, of full habit, generous in his diet, athletic and active, in whom a physician detected a mitral murmur during a casual attack of bronchitis. He was warned of the heart disease, restricted in his diet, and forbidden exercise. Unnecessary medical treatment, and the fear of sudden death, produced in this ardent young man depression both of mind and body. Dr. Stokes suspected that the murmur indicated some very old, passive, and stationary valvular disease, originating, some seven years previously, during an attack of rheumatic gout. He was re-assured, allowed stimulants in moderation, and advised to keep to his profession. Some years later he was seen in the highest state of health and spirits, after a month's excursion in Scotland, where he was on foot walking over mountains for eight hours a day, carrying a heavy gun, and using stimulants freely. The murmur continued unchanged.

Every medical man has met with cases, especially among the members of our own profession, wherein a casual palpitation had led to the fear of heart disease, such fear itself creating a crowd of formidable symptoms, the whole of which have disappeared as soon as a careful examination has convinced them that the heart is healthy. If the mere fear of heart disease can produce such formidable effects on the frame, how much more formidable must be the effects produced, when a patient, ignorant of the fact, is officiously informed that he has disease of the heart.

Dr. Stokes presents us with two cases illustrating an opposite state of things in two young girls, who, with all the symptoms of anæmia, presented what were probably only anæmic bruits. No diagnosis was made. One dropped dead while leaving her father's door, after having for three years perfectly regained her health. The other died in the course of two years, and in her the mitral orifice was so contracted as scarcely to admit the passage of a quill.

Two other cases are given, in which there was extreme aortic narrowing. One of these was a man of exceedingly active habits up to his fatal illness, a few days before death. The other, also of active habits, was attacked with extreme dyspnœa after walking up hill. Afterwards walking even on level ground produced great distress. In the course of six months he became dropsical, and died rather suddenly.

We have here, then, illustrations of the sudden development of the symptoms and signs of a long pre-existing disease, and of the great fact, that the sufferings of disease are much less dependent on the mechanical than the vital condition of organs.

"Considered with reference to practical medicine, we may divide cases of valvular disease into two classes; in one of which there is reason to believe that a carditis has been the first step in the morbid process, while in the second we are

without evidence that the alteration of the valve has been in any way connected with an inflammatory process. . . . . .

"In cases of the appearance of a valvular murmur, in the course of or immediately after the subsidence of an attack of pericarditis, we are to use all proper means to remove the endocardial inflammation. So, also, in the examples of the recent development of a valvular murmur in cases of excitement of the heart, even without pericarditis, the same practice is to be employed; and experience shows that in many of such cases the treatment is followed by success, and organic disease of the heart prevented. But we must be sure that the murmur is of recent origin, and we should take care not to prolong our treatment beyond a justifiable period. . . . .

"The persistence of the murmur for a week or ten days is regarded by Dr. Hope as indicating that the disease has passed into the chronic stage, and this, he observes, may continue for several weeks, or even months, and still be benefited by antiphlogistic treatment. I have seen several cases in which, after a month, there was this much evidence of a chronic inflammation, that stimulants seemed to over-excite the heart; but I think it probable that, should the murmur persist for more than three or four weeks, we should be very watchful, lest, by continuing a reducing treatment, we weaken the system too much in the vain endeavour to remove an organic change." (pp. 155, 156, 157.)

It is a source of real regret to us that Dr. Stokes, while stating "that we are to use all proper means to remove endocardial inflammation; and that, in many such cases, the treatment is followed by success, and organic disease of the heart prevented," has not detailed to us his mode of treatment. We to this day gain by the valuable suggestions as to treatment with which Dr. Stokes has throughout interspersed his work on 'The Diseases of the Lungs,' as the various cases arise. In this work he has not, unfortunately, pursued this plan to the same extent.

If the "reducing" treatment to be adopted in endocarditis consist in free mercurialization, large and repeated leechings and abstinence from food, or, indeed, whatever the "reducing' plan may be, we would strongly protest against its being continued for anything like three or four weeks. We would here put two very important questions—Does experience show that, in many such cases, treatment is followed by success, and organic disease of the heart prevented? and does a reducing plan of treatment tend to that all-important result? We fear that these questions must be answered in the negative. We hear an endocardial murmur, and we infer endocarditis; the patient recovers, and sometimes no sign of endocardial disease remains. Is it impossible for such a happy result to follow in some cases independently of all treatment? The vascular granulations and fibrine that fringe the valves in endocarditis, and cause regurgitation, tend of themselves, in the progress of the disease, to shrink up into minute beads or prominences, the mere cicatrices of the disease, that no longer render the valves inefficient. Unfortunately, the anxious part of such cases is that we find the murmur too often remain for life, in spite of our treatment. Are we quite certain that it never does so because of our treatment? Mercury, in its full action, tends to soften and disorganize the tissues. This unquestionably is so in pleuritis, pericarditis, and pneumonia, and we are compelled to infer that it is so likewise in endocarditis. We have now under our care, in St. Mary's Hospital, a young man with acute rheumatism, who was admitted in a state of ptyalism. There were then the signs and symptoms of a commencing endocarditis, which increased in intensity from day to day,

although—may we not say because?—the system was under the full influence of mercury. Absolute rest, the application of a few leeches, and opium, with or without antimony, repeated in grain doses, at first every two or three hours, and, as the required effect is produced, at longer intervals, along with lemon-juice or a saline, will, we believe, generally bring a case of endocarditis through at least as effectually as a more reducing plan of treatment. The only ground for giving mercury in such a case we believe to be the absence of bile in the motions.

Dr. Stokes, after making some valuable practical remarks on the importance of observing, in cases of valvular disease, whether there be obstruction to the circulation; increased or lessened, regular or irregular, action of the heart; and actual enlargement of the cavities of the organ, remarks—

"That, while the diagnosis of valvular disease depends on the existence and appreciation of certain physical signs, the questions of prognosis and treatment depend upon the condition of the muscular portions of the heart. . . . . . The study of cardiac pathology leads irresistibly to the conclusion, that in valvular disease the source of irregular and excited action is to be sought for less in the condition of the valves than in that of the heart itself." (pp. 160-61.)

Irregular or intermittent action of the heart, he well remarks, is by no means necessarily due to heart-disease. Sometimes these exist where an emetic, an anti-nervous draught, an attack of gout, or a few doses of a mercurial, will restore the natural action of the heart. This was well illustrated in the case of a lady who was for some years subject to attacks of violent palpitation, attended by a loud bellows-murmur. Dr. Stokes, who was consulted during a paroxysm, saw her again in ten days—the heart was tranquil, and every trace of murmur had disappeared. Several years later, he saw her in perfect health. She had discovered her own cure, and this was the use of an emetic at the commencement of each attack.

In the case of a young man suffering from the most violent action of the heart, the treatment was of extreme activity; repeated bleedings, mercury, and other such means, produced not the slightest effect on the heart's action, though his strength was much exhausted. Death being expected, the treatment was fortunately suspended. An ether and laudanum draught excited vomiting, whereon the heart became tranquil, the murmurs disappeared, and the convalescence was rapid.

Dr. Stokes says, truly, that an imperfect state of the valves may be induced by many causes besides inflammation. In that spirit of subtle analysis which so often distinguishes him, he enumerates these, and adds, that if we include inflammation we have not less than twelve pathological conditions which may induce valvular disease. (p. 172.)

Forget's statement that isolated cases of disease of the aortic and of the mitral valves are about equally frequent, and that their simultaneous affection is as frequently met with as the isolation of disease in either orifice, is thought by Dr. Stokes to be not far from the truth if we consider the mere occurrence of anatomical lesion rather than the actual amount of disease; but if we discard cases of slight alterations, insufficient to interfere with the action of the valves, it will probably be found that there are more cases of isolation of disease of the mitral than the aortic orifice. Let us test these inferences by the observations of others. According to—

Dr. Barclay's First Report*	of 79 cases,	both valves suffered in 36,	the mitral alone in 17,	the aortic alone in 26.
Dr. Barclay's Second Report†	46	„ „ 22	„ 18	„ 6.
Dr. Chambers‡	367	„ „ 133	„ 106	„ 112.
Dr. Ormerod§	181	„ in about 68	„ in about 64	in about 48.

Influence of Age:

In Dr. Ormerod's 181 cases	There were, below 30	61	„ in about 23	„ in about 30	in about 8.
	„ above 30	120	„ „ 45	„ 35	„ 40.

Influence of Severity of Disease:

In Dr. Ormerod's 181 cases	There were, of severe cases	39	„ „ 13	„ 19	„ 7.
	„ of less severe cases	142	„ „ 55	„ 46	„ 41.

Influence of Associated Disease:

Acute rheumatism at the time or before	Dr. Ormerod	42	„ in about 23	„ in about 15	in about 3.
	Dr. Barclay	69	„ „ 53	„ 12	„ 4.
Kidney disease: Dr. Ormerod		42	„ in about 19	in about 17	in about 6.
All diseases except kidney and rheumatism: Dr. Ormerod		97	„ in about 26	in about 32	in about 39.
Atheroma of valves: Dr. Barclay		28	„ „ 4	„ 12	„ 12.

In all the above returns, diseases of the tricuspid and pulmonic valves are put out of sight. Of Dr. Ormerod's 181 cases, in 17 the former, and 6 the latter, were affected; and of Dr. Chambers' 367 cases, in 29 the former, and 14 the latter, were affected.

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* Medico-Chirurgical Transactions, vol. xxxi.

† Ibid., vol. xxxv. This return excludes those cases in which it was doubtful whether they had or had not previously suffered from acute rheumatism.

‡ Decennium Pathologicum: Medico-Chirurgical Review.

§ Gulstonian Lectures, 1851. In these lectures, Dr. Ormerod enumerates them thus;—Total cases, 191. Of these, the mitral valve was affected 133 times; the aortic, 116 times. To bring them under the same heading with the others we have used a calculation that is disturbed by the possible isolation of disease to the tricuspid or pulmonary valves. This disturbance though real, is trifling, and although we say "about," the returns are very nearly accurate.

From this table we may safely infer that the mitral valves are more subject to disease than the aortic; that the disease is more often limited to one valve or other, than common to both, but that it is more often common to both than limited to either; that when associated with acute rheumatism, disease affects both valves in the greater number of cases, and the mitral more frequently than the aortic; that in the young, who are subject to acute rheumatism, disease of the mitral, and in the old, who are subject to atheroma, disease of the aortic valve predominates; and that in the more severe cases, in which the valve disease is itself the cause of death, the mitral valve is by far the most frequently affected. The last inference, if confirmed by larger returns, is of great importance, seeing that it proves mitral valve disease to be the most prone to go on to a fatal issue, more so even than simultaneous disease of both valves. Dr. Ormerod is the only observer who, giving all cases of valve disease, has made the important distinction between the slighter cases and those in which the valve disease was itself the cause of death. We trust that this distinction will in future be made by those accurate observers now engaged with the statistics of heart disease.

Dr. Stokes justly remarks, that the so-called *new* law laid down by Forget, that the cavities of the heart are dilated and hypertrophied behind the seat of valvular obstruction, and entitled the law of dilatation *a tergo*, was already vindicated by Dr. Adams, in his admirable paper in the fourth volume of the 'Dublin Hospital Reports.' Forget deserves credit for calling attention strongly to *retro-dilatation* as an additional diagnostic sign in diseases of the valves. The pathological condition, however, of dilatation and hypertrophy *a tergo* has been clearly stated by many of the best observers, long before either Dr. Adams or Forget wrote. Senac puts the whole case comprehensively before us.* He states that obstruction to circulation in the aorta, whether from narrowing or dilatation of the vessel, or (though this is less clearly stated) from disease of its valves, causes dilatation of the left ventricle; while obstruction to the circulation through the lungs causes dilatation of the right cavities. He also states that obstruction or regurgitation through the auriculo-ventricular opening causes dilatation of the auricle. He likewise gives a case in which aortic regurgitation caused extensive dilatation. In reasoning on a remarkable case of aortic valve disease, related by Lancisi, in which the left cavities were small, the right dilated, he conceives that the left ventricle, though the first to be engorged, might resist the dilatation, owing to the thickness of its walls: but considering the small size of the left auricle, he conceives that there must have been in the lungs themselves some obstacle which arrested the blood in the right cavities. Morgagni,† who re-states with greater precision the views of Senac, while arguing on this very case, says, that dilatation of the left ventricle is joined with disorders of the aorta or its valves, that of the right ventricle with impediments in the pulmonary artery or lungs. Portal,‡ in giving a lucid digest of Senac's views, says that if the obstacle to circulation reside in the aortic opening, the aorta itself, or its minute branches, the left ventricle may be dilated by the blood, which finds a difficult exit, and

* Maladies du Cœur, tom. i. pp. 406—54. † Letter xviii. 5.
‡ Anatomie Médicale, tom. iii. p. 90.

then the left auricle and pulmonary veins; and that in succession the right ventricle and auricle, and even the venæ cavæ, may be dilated. Burns* from observation, takes up a position diametrically opposite to Dr. Parry's statement, that it is generally the cavity immediately before the obstructed part which is dilated; and states that, in proportion to the resistance offered to the passage of the blood, the circulating powers have their strength augmented. Corvisart, Dr. Williams, Rokitansky, and many recent authors, have clearly stated the law of dilatation and hypertrophy *a tergo*.

To find out as nearly as possible the actual and ascertained effect of the several valve diseases on the walls and cavities of the heart, we have made an analysis of such cases, given by various authors, as throw light upon the subject.† Before examining this evidence, it will be well to consider what other morbid states, besides the various valve diseases, influence the cavities and walls of the heart. In most cases of disease, there is not one ailment only, but the association of several morbid states. It is often difficult to discover which of these morbid states was induced by, and which induced the others. Disease in one organ is often at once both the effect and the cause of disease in another organ, so intimate and continual are the mutual reactions of one part of the frame upon another, which, indeed, blend to form the whole living organism. These different morbid states existing at the same time, may tend to produce totally opposite effects, and thus sometimes we shall have a result common to both or several causes; sometimes one influence will override the other, so that a given morbid state may not be followed by its usual effects and diagnostic signs.

All pathologists agree, that dilatation or hypertrophy, or both, of the right cavities may be, and usually is, excited by bronchitis, emphysema, and any lung disease in which there is an obstacle to the flow of blood through the lungs. Phthisis appears to be an exception to this law; but in phthisis, the blood and the solids are both lessened in proportion to the lessened capacity of the lungs. This is not so, however, always; and if we examine the weight of the heart in cases of phthisis, we shall find that in scarcely any case is the heart lessened in average weight more than the body. In many cases the heart maintains the normal size, although the body has lost weight largely, and in some cases the heart is absolutely larger than it is in health. We need scarcely say, that in the first case, the heart is normal in relation to the body and blood, and that in both the last cases it is really enlarged.

Rokitansky‡ gives a complete analysis of the conditions of the lungs inducing active dilatation of the right cavities; and he also rightly claims for disease of the arterial trunks, such as atheroma, aneurism, dilatation, or narrowing—whether of the lungs or of the system—the power of inducing dilatation of the right and left cavities respectively. But, while he recognises obstruction through the pulmonic capillaries as

* Diseases of the Heart, p. 167.

† These cases, in number 96, the analysis of which is grouped in the following table, are related by Abercrombie, Adams, Barlow, Bouillaud, Burns, Chevers, Corvisart, Forbes, Forget, Hodgkin, Hope, Laennec, Latham, M'Dowell, Mills, Ormerod, Parkes, Senac, Sibson (MS.), Spittal, and Stokes.

‡ Pathological Anatomy (Sydenham Society's translation), vol iv. pp. 162—4.

a cause of dilatation of the right ventricle, he does not recognise obstruction through the systemic capillaries as a cause of dilatation of the left ventricle. In a paper on the causes of respiration,* we have considered the retrograde influence of the systemic as well as the pulmonic capillaries on the heart. Under the influence of fright and despair, and even joy, the left ventricle has again and again been ruptured;† the action of the ventricle has been so strong as absolutely to lacerate itself; but the obstruction to the circulation through the capillaries has been so great, as to prevent the escape of the blood, and to cause the walls of the cavity to spend their force upon themselves. The depressing passions occasion hypertrophy of the left ventricle, as Senac remarked, an effect palpably due to the continued resistance to the systemic capillary circulation, and the augmented force used by the ventricle to overcome the obstacle.

In kidney disease, hypertrophy and dilatation of the left ventricle is a frequent effect. Dr. Bright, in the first volume of 'Guy's Hospital Reports,' gives 100 cases of Bright's disease; of these, 52 had hypertrophy, although no valve disease existed in 34 of them. In 11 of these 34 cases, the coats of the aorta were affected. The hypertrophy was most marked in the left ventricle 21 times, in the right, twice; and in these two cases the lungs were affected. It is clear, as Dr. Bright suggests, that the altered quality of the blood so affects the capillary circulation as to render greater action necessary to force the blood through the distant subdivisions of the vascular system. In 33 cases, the heart was healthy or small. This tends to prove that it is not obstructed circulation through the capillaries of the kidneys alone that induces the hypertrophy, but rather through those of the whole system. Dilatation and hypertrophy arise really from the same cause—namely, increased resistance to the exit of blood from the cavity, and increased efforts to expel the blood. If the walls be soft and yielding, dilatation is in excess of hypertrophy—if firm and fleshy, hypertrophy is in excess of dilatation; usually, however, they are combined.

* Provincial Medical Transactions for 1851.

† See Dr. Stroud, on the Death of Christ, for many instances.

Of 20 cases of narrowing of the aortic aperture, usually with valvular insufficiency—

The heart was large in 17; of normal size in 3—

The left ventricle was dilated (2), or hypertrophied (1), or both (12), in 15; normal in 1; hard, but of normal size, in 3; smaller than right ventricle in 1.
The left auricle was dilated (4), or hypertrophied and dilated (5), in 9; normal in 6; not mentioned in 5.
The right ventricle was dilated (5), or hypertrophied and dilated (6), in 11; normal in 5; not mentioned in 4.
The right auricle was dilated (5), or hypertrophied and dilated (4), or large (1), in 10; normal in 3; not mentioned in 7.

Of 13 cases of aortic regurgitation, in which the aperture was either normal or dilated—

The heart was large in all—

The left ventricle was dilated (2), or hypertrophied and dilated (11), in 13.
The left auricle was dilated (2), or hypertrophied and dilated (3), or large (1), in 6; normal in 1; not mentioned in 6.
The right ventricle was dilated (5), or hypertrophied (1), or both (3), or large (2), in 11; normal in 1; not mentioned in 1.
The right auricle was dilated (3), or hypertrophied and dilated (3), or large (3), in 9; normal in 1; not mentioned in 3.

Of 6 cases of disease of the pulmonic valves—

The left ventricle was moderately large and thick in 1; normal in 3; not mentioned in 2.
The left auricle was normal in 2; not mentioned in 4.
The right ventricle was hypertrophied and dilated in 3; normal in 1; not mentioned in 2.
The right auricle was hypertrophied and dilated in 1; normal in 1; not mentioned in 4.

Of 23 cases in which the mitral aperture was contracted and usually regurgitant—

The heart was enlarged in 20; flaccid and pale in 1; size not stated in 2.

The left ventricle was dilated (4), or hypertrophied (3), or both (2), or large (1), in 10; normal in 7; not mentioned in 6.
The left auricle was dilated (7), or hypertrophied and dilated (5), or large (1), in 13; normal in 2; not mentioned in 8.
The right ventricle was dilated (5), or hypertrophied (1), or both (7), or large (1), in 14; normal in 3; not mentioned in 6.
The right auricle was dilated (10), or hypertrophied and dilated (4), or large (2), in 16; normal in 1; not mentioned in 6.

Of 6 cases in which the mitral aperture was regurgitant but not contracted (in 3 dilated)—

The left ventricle was dilated (1), or dilated and hypertrophied (2), or large (2), in 5; normal in 1.
The left auricle was dilated (1), or dilated and hypertrophied (1), or large (1), in 3; normal in 1; not mentioned in 2.
The right ventricle was dilated slightly (1), or large (1), in 2; normal in 2; not mentioned in 2.
The right auricle was dilated slightly (1), in 1; normal in 1; not mentioned in 4.

Of 28 cases of disease common to both mitral and aortic valves—

The heart was decidedly enlarged in 22; slightly so in 4; size not stated in 2—

The left ventricle was dilated (2), or hypertrophied (4), or both (10), or large (5), in 21; normal in 2; not mentioned in 5.
The left auricle was dilated (3), or hypertrophied (2), or both (8), or large (4), in 17; not mentioned in 11.
The right ventricle was dilated (5), or hypertrophied (7), or both (4), or large (1), in 17; normal in 3; not mentioned in 7.
The right auricle was dilated (4), or hypertrophied (2), or both (6), or large (3), in 15; normal in 2; not mentioned in 11.

These tables tend to prove, that by far the larger proportion of valve diseases thicken the walls and enlarge the cavities of the heart; that aortic regurgitation with, and still more without, narrowing, of the aperture induces active dilatation of the left ventricle, followed consecutively by enlargement of the left auricle, and the right ventricle and auricle; that disease of the pulmonic valves causes dilatation of the right cavities; that mitral narrowing, with regurgitation, leads to enlargement of the left auricle, followed in succession by dilatation of the pulmonary veins, congestion in the lungs, enlargement of the right ventricle and auricle, distension of the venæ cavæ, engorgement of the liver, congestion in the systemic capillaries, and at length, and in nearly one half of the cases, enlargement of the left ventricle; and that combined disease of the aortic and mitral orifices, causes enlargement of the left ventricle, and to a less, but nearly the same extent, of all the other cavities. Forget lays down, at p. 201, the law, from the observation of one case, that when the narrowing of the aortic and mitral orifices is equal, the left ventricle is neither hypertrophied nor dilated. The observations brought together in the above table contradict this law of Forget's, which is, indeed, upset by a case given by himself, at p. 208, wherein the aortic and mitral orifices were both ossified, and yet the left ventricle was much dilated and hypertrophied.

In the great majority of cases in which a murmur is heard, the murmur will of itself lead us to a correct diagnosis; in some, however, as we have already seen, it will not. In such instances, the size and force of the heart will materially aid us. As a rule, if there be valve disease, the heart is enlarged, and its impulse is increased in extent and power. Now, if the murmur be anæmic, the heart is usually lessened rather than enlarged, and the impulse, though it may be preternaturally strong and troublesome, yet it is quick and smart, and limited within the cardiac region. Murmur may, however, be present without valve disease, when there is enlargement of the heart from fatty degeneration, from kidney disease, or gout, or from adhesions. In fatty disease, the extent of cardiac dulness may be increased, but the impulse, though possibly extensive, is generally, but not always, feeble. In kidney disease the impulse may be as extensive and powerful as in valve disease. When adhesions exist, with heart enlargement, the superficial cardiac region extends as high as the second costal cartilage; the sternum and ribs, and the intercostal spaces, are drawn firmly inwards during systole, returning with a shock during diastole; and the extent of dulness and of impulse are scarcely lessened during a deep inspiration. Then all these conditions may co exist when murmur is present, and that, too, when there is not, as well as when there is, valve disease. The extent of cardiac dulness, and the amount and power of the impulse, may all, like other diagnostic signs, taken singly or even collectively, fail us in our attempt at a diagnosis. As Laennec long ago observed, and as Dr. Stokes so often and so well enforces, valve disease has but little influence on health when the muscular condition of the heart remains sound. It is by the extent and power of the impulse that we discover the heart's muscular condition, and its observation is, therefore, practically always of the greatest importance.

The left ventricle being more frequently actively dilated in disease of

the aortic, the right ventricle in disease of the mitral orifice, the power of distinguishing this condition is sometimes of value. If the left ventricle be enlarged and hypertrophied, the impulse at the apex protrudes strongly, steadily, and extensively, often as low as the sixth intercostal space, and as far to the left as an inch beyond the nipple.

"If the right ventricle be enlarged, and its walls thickened, the lower half of the sternum, the xiphoid cartilage, and the left costal cartilage from the third or fourth to the seventh, are heaved gently and steadily forwards, not by a pointed impulse, but by a diffused steady advance; the protruded walls usually fall back quickly towards the end of the systole."*

We must be careful not to infer that the heart is enlarged, when the perceptible impulse is increased owing to the uncovering of the heart when the lungs collapse and shrink away from before it, which is often the case in the weak, especially when confined to bed. Still less must we decide that the heart is small when, owing to emphysema, the heart is shielded from examination by the enlarged and interposed lung, and is drawn down into the epigastrium by the habitual descent of the diaphragm, when the impulse is felt, not between the ribs, but in the epigastrium only; and when the heart, instead of being small, is actually enlarged, especially in the right cavities. We must then take care not to mistake a large for a small heart, because it is covered by enlarged lung, nor a small for a large heart, because it is naked of lung. Forget gives, with admirable candour, a case illustrative of this source of error, in which he mistook aortic for mitral disease, owing to supposed non-hypertrophy of the left ventricle, that ventricle being evidently masked by emphysematous lung; he at length made the correct dead-house diagnosis of disease of the aortic aperture, when he saw that the left ventricle was enlarged.

Since Dr. Corrigan's valuable paper on aortic disease,† the aid afforded by the pulse in the diagnosis of heart disease has been well appreciated. The visible, or as Dr. Stokes rightly terms it, the *collapsing* pulse gives us the key, not only to the existence of insufficiency of the aortic valves, a pathological condition long since indicated by Lancisi,‡ but brought more completely before us by Dr. Hodgkin, in his valuable paper,§ but it is also with variable precision the key to the degree of the valvular patency, the size of the aortic orifice, and also, if we watch the case from day to day, the power of the heart.

When there is excessive aortic regurgitation, and when the arteries are enlarged and varicose from atheroma, the tortuosities of the subclavian, may be so prominent and throbbing as to be mistaken in some cases for subclavian aneurism. There is another source of that error in the local murmur that is sometimes heard over the outer end of the clavicle, towards the end of a deep, or even ordinary, inspiration. This murmur is due to the stretching of the artery during inspiration, where it bends downwards over the edge of the first rib—that rib being then raised, while the artery itself is drawn downwards, owing to the inspiratory descent of the heart. This bruit is most frequently present when the upper part of the chest is prominent, and when the blood is watery.

* Provincial Medical Transactions, vol. xii. p. 555.
† Edinburgh Medical and Surgical Journal, 1832.
‡ De Motu Cordis, p. 341.
§ London Medical Gazette, 1829.

Dr. Stokes is silent as to the blocking up of the larger arteries, by the detachment of fibrinous deposits from the interior of the heart, a condition to which attention has been so strongly directed by Virchow,* Dr. Kirkes,† and Dr. Simpson.‡ Rokitansky§ considers that in endocarditis the fibrinous vegetations on the valves are worn out superficially, and taken into the blood in fine particles; and that their absorption into the mass of the blood leads to secondary coagula in the capillaries of the spleen and kidneys, and to obliteration of those vessels. The fibrinous deposits on the valves are not necessarily the result of endocarditis, but may be, so to speak, whipped out of the blood, when surcharged with fibrine, by the thickened and roughened valves. It appears probable that Bright's disease, which often appears to be associated with valve disease as a cause, is associated with it also as an effect, owing to the plugging of the capillaries by the fibres detached from the valves. This view derives some confirmation from an analysis which we have made of the cases of valve-disease tabulated by Dr. Barclay. Of 81 of these cases (putting aside doubtful ones) acute rheumatism alone had existed in 28; Bright's disease alone was present in 35, and both diseases were associated in 18. In most of the last cases, acute rheumatism of old standing had evidently induced the valve-disease; and it is probable, we conceive, that in some of them the detached fibrine plugging the renal capillaries aided in causing the Bright's disease.

We have chosen, in this article, to restrict ourselves to pericarditis and its effects, endocarditis and valve disease. We shall merely mention a few of the many additional points of value contained in the work of Dr. Stokes. In his chapter on fatty degeneration, Dr. Stokes brings into prominent notice the important and remarkable sign first observed by Dr. Cheyne, of the alternate acceleration and apparent arrest of respiration; the respiration seems to cease for from ten to twenty-five seconds, so as to simulate death: it then returns, becoming gradually of an extraordinary quickness and depth; at length it again dies away, and is again renewed; the successive changes, occupying about a minute, recur with amazing regularity, so as almost to mark the time. Usually this condition lasts about a week before death, but we had a patient under our care in St. Mary's hospital, who presented these singular phenomena night and day, sleeping and waking, from the date of his admission to that of his death, three weeks later.

It will have been gathered, from the remarks already made, that Dr. Stokes condemns over-treatment, and in many cases, all medicinal treatment whatever. He is indeed opposed to routine methods, and adopts with great distinctness Dr. Corrigan's admirable maxim of sustaining, rather than debilitating, in cases of heart-disease. When the liver becomes excessively congested and hard, so as additionally to obstruct the circulation, he advises mercury, pushed no farther than to produce the desired effect, as the only means capable of relieving the hepatic congestion.

Great objection is taken to that large part of Dr. Stokes' work that

* Virchow's Archiv, vol. i. † Medico-Chirurgical Transactions, vol. xxxv. p. 281.
‡ Association Medical Journal, No. liv. p. 4.
§ Pathological Anatomy, vol. iv. pp. 185, 221. Sydenham Society's translation.

relates to the state of the heart in fever, and that, too, by those who enjoy the largest opportunities of observing the disease. When bronchitis is present in fever, the lungs being large and the breath sounds noisy, the impulse may be imperceptible and the sounds inaudible, although the heart's action be strong. It is possible, but not likely, that Dr. Stokes may have observed such cases imperfectly, but from our faith in his general accuracy of observation, we feel assured that, in many cases of fever wherein the heart is softened and its action low, the sounds are sometimes obliterated, more particularly the systolic sound. With regard to fever, we would remark that, like the fauna or flora of a locality, it differs in type at different places and among different people, and we doubt not that the fevers of London scarcely offer a fair parallel with the fevers of Dublin. Our own opportunities of observing fever are comparatively limited, and we cannot, therefore, speak with confidence on this part of Dr. Stokes' work; we think, however, that too large a space is occupied with the subject.

We have already said that Dr. Stokes' work, though so valuable to the medical man, is apt to prove confusing to the student. We agree fully, however, with a remark made to us by one of the most able and laborious of the many able medical men now at work in the north, that, notwithstanding its disadvantages, Dr. Stokes' work, like Dr. Latham's, is really more instructive even to the student than the more systematic works on diseases of the heart. Nothing can be more fruitful of error than the fashion of placing in a finished, arranged, and made-easy manner, a subject which, from its variety and complication, is full of difficulty even to the most matured observers. Can that which is difficult to the advanced physician be made easy to the unpractised student? Certainly not. The lucid descriptions and precise definitions of disease which the student thus receives can never be more than the descriptions and definitions of small groups of cases.

In conclusion, we strongly advise both medical men and medical students to familiarize themselves with the two works before us. In Dr. Bellingham's work they will find, well and comprehensively stated, that fundamental knowledge which will fit them to comprehend more easily the infinite but orderly varieties of disease; and in that of Dr. Stokes, they will find throughout that spirit of practical and sagacious observation which it is so important that they should themselves acquire.

F. Sibson.

Review XIV.

1. *Ueber dem Bau und Zusammensetzung der Corpora Amylacea des Menschen.* Von R. Virchow. ('Verhandlungen der Physikalisch-Medicinischen Gesellschaft in Wurzburg.' Zweiter Band, 1852. p. 51.)

On the Structure and Relations of the Corpora Amylacea of Man. By Dr. R. Virchow.

2. *Ueber Polypen des Ausseren Gehörgänges.* Von Dr. G. Meissner. ('Henle's Zeitschrift für Rationelle Medicin.' Dritter Band, 1853. p. 357.)

On Polypi of the External Auditory Meatus. By Dr. Meissner.

3. *Ueber eine im Gehirn und Ruckenmark des Menschen aufgefundene Substanz mit der Chemischen Reaction der Cellulose.* Von R. Virchow. ('Archiv für Pathologische Anatomie und Physiologie.' Sechsten Band, Erstes Heft, 1853. p. 135.) Also an Abstract in the 'Comptes Rendus,' No. 13, Sept. 26th, 1853.

On a Substance found in the Brain and Spinal Cord of Men, having the Chemical Reaction of Cellulose. By Dr. Virchow.

4. *Weitere Mittheilungen über das Vorkommen der Pflanzliche Cellulose beim Menschen.* Von R. Virchow. ('Archiv für Pathol. Anat. und Physiolog.' Sechsten Band, Zweites Heft, 1853.) Also an Abstract in the 'Comptes Rendus,' No. 23, Decr. 5th, 1853.

Further Communications on the Occurrence of Vegetable Cellulose in Men. By Dr. Virchow.

5. *Zur Cellulose Frage.* Von R. Virchow. ('Archiv für Pathol. Anat. und Physiol.' Sechsten Band, Drittes Heft, 1854. p. 416.)

On the Cellulose Question. By Dr. Virchow.

6. Canstatt's *Jahresbericht über die Fortschritte der Gesammten Medicin,* in Jahre 1853. Erster Band, 1854.
   a. *Bericht über die Leistungen in der Allgemeinen und Speciellen Anatomie.* Von Prof Dr. Henle. p. 21.
   b. *Bericht über die Leistungen in der Physiologischen Chemie.* Von Prof. Dr. Scherer. p. 98.

Reports on the Progress of Anatomy and of Physiological Chemistry. By Professors Henle and Scherer.

7. *On a Substance presenting the Chemical Reaction of Cellulose in the Brain and Spinal Cord of Man.* (Virchow's 'Archiv,' with Observations by Mr. G. Busk: 'Journal of Microscopical Science,' No. 6, Jan. 1854. p. 101.)

8. *Die Speck oder Cholesterin-krankheit.* Vom Prosector H. Meckel. ('Annalen des Charité-Krankenhauses zu Berlin. Vierter Jahrgang, Zweiter Heft, 1853. p. 264.)

The Bacony or Cholesterin Disease. By Dr. Meckel.

That *quæstio vexata,* the distinction between animals and plants, after much subtle disquisition, and the rise and downfal of many ingenious hypotheses, seemed at length to receive a simple and tolerably satisfactory

solution in the supposed limitation of starch to the vegetable kingdom. Yet no sooner had this opinion gained ground, and had naturalists begun to employ it in determining the animal or vegetable character of doubtful organisms, than, by the perverse ingenuity of an industrious German—Carl Schmidt*—it was discovered that the tunic of Ascidians contained a substance having the chemical reaction of starch, or, more strictly speaking, of its isomeric congener, cellulose.

This discovery was followed up by Löwig and Kölliker,† who proved the existence of cellulose in many other of the Ascidia, both the simple and compound; in most animals, indeed, of the order Tunicata; and Dr. H. Schacht‡ and Mr. Huxley§ have more recently inquired into the anatomical and physiological relations of that substance to the animal tissues.

Still the belief in cellulose being peculiar to plants could not at once be surrendered as untenable; and it was urged against Schmidt's observation, that the starchy material in the mantle of Ascidia was of adventitious origin—a foreign substance, probably derived from their food, intermingled with the tissue. But this plea was, in its turn, soon set aside by the discovery that the yet embryonic Ascidians, excluded from any foreign admixture with vegetable products, contained cellulose equally with the adult animals.

It is now consequently received as a fact, that cellulose enters into the structure of these inferior beings. By itself it constitutes no one of their tissues, as happens in plants, but it is associated with their nitrogenous elements, and is in some way connected with their nutrition. The conditions under which it exists in the two divisions of animated nature, respectively, are still matters of discussion, which we, however, cannot here enter into. Suffice it to say, that Schacht contends for a distinction in the relations of cellulose to animal and to vegetable tissues; whilst Huxley, on the contrary, affirms that those relations are anatomically and physiologically alike in the two.

So long as the existence of an amylaceous material was recognised only in the simple ascidian Molluscs, and in a few other beings equally low, or even lower in the animal scale, which partake, in not a few particulars, the attributes of vegetable organisms, the interest of it as a fact was rather limited to the naturalist, and in only a subsidiary manner extended to the medical philosopher. On the announcement, however, by Professor R. Virchow, of Wurzburg, of the discovery of a substance in man having the reaction of cellulose, it was at once evident that, to the human physiologist, a point of the highest interest and importance had been raised. It had recently been proved by Claude Bernard, that the animal organs could elaborate other than animal products; that, for instance, the liver was a sugar-forming organ; now another phenomenon of the same class seemed brought to light—viz., that cellulose, the material of the cell-wall of plants, might be developed in the processes of human nutrition.

This discovery of Virchow illustrates the value of combining chemical

* Zur vergleichenden Physiologie der wirbellosen Thiere. 1845, p. 61.

† Comptes Rendus, 1846, p. 38; and Annales des Sciences Naturelles, 1845, p. 193.

‡ Müller's Archiv, 1851, p. 176; and Journal of Microscopical Science, vol. i., 1853, pp. 35, 106.

§ Ibid., p. 22.

with microscopical researches. It is, indeed, by the joint prosecution of the two means of investigation that we must hope at length to fathom some of the processes of healthy and diseased nutrition at present concealed from us.

To proceed, Virchow informs us, in his first paper, that the detection of cellulose in the Ascidia induced him to seek for it also in the human frame, and that, from an accordance in general appearance between the jelly-like tissue of those simple animals and the gelatinous matter of the umbilical cord, his inquiries were first directed to the latter, but without success. Having regard, doubtless, to the external conformity of structure of the *corpora amylacea* of the brain and of starch-corpuscles, he subsequently subjected the latter to the tests for cellulose, and had the satisfaction of finding them display the characteristic colour. These bodies, on the addition of iodine, first acquired a pale blue, and upon the subsequent addition of sulphuric acid, presented the beautiful violet reaction characteristic of vegetable cellulose.

Thus far the researches of Virchow had the support of analogy, both in respect of structural resemblance and of chemical reaction.

The *corpora amylacea* mentioned appear to have been first seen in the brain by Purkinje, and to have been so named by him on account of their rounded, concentric, and laminated figure recalling very closely the appearance of starch corpuscles. Their discoverer, we believe, however, included under that appellation other granules besides those lately noticed by Virchow, to exhibit the reaction of cellulose—such as the calcareous particles which constitute brain sand, and possess equally evident concentric laminæ about a nuclear point or hilum, as we have elsewhere pointed out.* And although Virchow has, in his later papers, carefully distinguished the earthy from the other starch-like bodies, yet he, in his communication to the Wurzburg Academy on the *corpora amylacea*, evidently included both under that appellation. This is also done by Meissner in his account of concentric cells in a cystic polypus of the ear. Our present knowledge, however, renders it necessary to keep the distinction in view, and this will be best done by restricting the term *corpora amylacea* to that variety which, by reason of its physical and chemical characters, is more closely assimilated to starch. The other variety will be sufficiently indicated by the designation of calcareous concentric corpuscles.

The cellulose reaction was, on the first promulgation of his views, supposed by Virchow peculiar to the amylaceous bodies of the great nervous centres, found in the *ependyma ventriculorum* and its prolongations. This ependyma forms the lining of the cerebral ventricles, lying subjacent to their epithelium. According to Virchow it is a connective tissue of the nerve elements, not restricted to the brain, but extending from the fourth ventricle the whole length of the spinal cord to the *filum terminale*, under the form of a continuous gelatinous band. In the cord it is essentially the ependyma of the obliterated central canal of the fœtus, and has been called, by Kölliker, the *substantia grisea centralis;* Virchow would prefer naming it the *central ependyma filament.* The

* See Original Communications: Art. II., Observations on Brain Sand and Amyloid Bodies.

cellulose exists in this spinal ependyma generally, but apparently in greater abundance in its upper portion. The ependyma

"Contains very fine cellular elements, and a matrix sometimes of more dense, sometimes of softer consistence, and is continued on the internal aspect without any special boundary between the nervous elements. In the deeper layers of this membrane, and in immediate contiguity with the nerve fibres, the cellulose corpuscles are found most abundantly, and they are also especially numerous where the ependyma is very thick. They are consequently very abundant on the fornix, septum lucidum, and in the stria cornea in the fourth ventricle; at times they occur of excessively minute size. In the spinal cord, the substance corresponding to the ependyma lies in the middle, in the grey substance. . . . . Its cells are much larger and more perfect than those of the cerebral ependyma.

"In other situations I have sought," says Virchow, "for these bodies (cellulose) in vain, and in particular, I have been unable to find them in the external cortical layer of the cerebrum, or anywhere in the interior of the cerebral substance. . . . . In the child I have, as yet, searched for cellulose in vain, so that, like the 'brain-sand,' it appears to arise in a later stage of development, and probably may have a certain pathological import.

"The cellulose granules, therefore, appear to be everywhere connected with the existence of the ependyma-substance of a certain thickness, and might perhaps be regarded as a constituent of it."

In following up his investigations, Virchow soon found that corpora amylacea were not confined to the localities named, but existed also in the higher nerves of sense—in the auditory and optic nerves; and he consequently assumed that an ependyma extended into them. This assumption involved some change in the definition of the ependyma as heretofore given, and Virchow,

"From a series of pathological observations, concluded that a soft matrix, referrible mainly to connective-tissue substance, everywhere pervades and connects the nervous elements in the centres, and that the ependyma is only a free superficial expansion of it over those elements. The opinion that the epithelium of the cerebral ventricles rests immediately on the nervous elements, appears to have risen from a confusion of this interstitial substance with the true nerve-substance."

The views hitherto expressed rested on the supposition that cellulose corpuscles were found in connexion only with the nervous tissue, or more particularly with its ependyma, or "connective substance." We shall presently see that this opinion will not hold good; that at least in one other organ, granules, answering to the tests for cellulose, exist, having no relation to nerve matter. We will, however, first call attention to the observations of others on the corpuscles found in the cerebro-spinal axis and its offshoots.

On the publication of the above researches by the Wurzburg professor, numerous other workers appeared in the same field; the majority of whom confirmed them so far as related to the existence of corpuscles in the ependyma, affording blue and violet tints with iodine and sulphuric acid; but on the subject of their chemical nature the greatest diversity of opinion did, and still does prevail.

Both Rokitansky and Scherer found those peculiar bodies in the ependyma; Kölliker detected them in the retina, and Mr. Busk has assigned to them a much wider range in the brain than that allotted by Virchow. The observers first named have recorded no additional facts, but Mr.

Busk has supplied us with original observations and opinions which require to be here stated.

The first brain he examined for cellulose

"Was that of a young man who died of the consecutive fever of cholera, after an illness of five or six days, during the whole of which period the renal secretion was completely suppressed. What I noticed (Mr. Busk goes on to say) in this case was:—

"1. The enormous abundance of the corpora amylacea in certain situations, as the ependyma ventriculorum, particularly on the septum lucidum, and more especially also on the choroid plexuses; upon gently scraping the surface of which a fluid was obtained, containing these bodies in the most surprising quantity.

"2. That they existed in immense abundance in the olfactory bulbs, and in the superficial parts of the brain, both cortical and medullary, contiguous to the tract of the olfactory nerves. But scarcely any part of the cerebrum and cerebellum could be examined, at all events towards the surface, without meeting with some or more; and they occurred abundantly in the very middle of the cerebellum. Their distribution, however, was very irregular, inasmuch as they abounded in some spots, and were nearly, if not altogether, wanting in others. I could find none in the corpora striata, where they seemed to be replaced by 'brain-sand.' . . .

"3. The cerebral substance, in immediate contiguity with the corpora amylacea, appeared quite natural. . . . . The corpuscles were of all sizes, from less than a blood-disc up to 1-500th of an inch or more; generally more or less ovate, but many irregular in outline, and apparently flattened. . . . . . Many of the larger ones showed the appearance which, in starch, has been erroneously described as indicative of a laminated structure: whilst in others this appearance, under any mode of illumination, certainly did not exist. The point that would correspond with the so-called nucleus of a starch-grain was, unlike that of most kinds of starch, central, and consequently the laminated marking was concentric to the grain, which is rarely the case in the starch of plants."

Mr. Busk's second case was "that of an old man—dead of chronic dysentery, and who died comatose." The ventricles were found distended with about three ounces of clear fluid. The ventricular lining was studded with minute transparent granulations, but corpora amylacea were absent. Of the latter structures none were found

"In the central substance of the brain; a few were met with in the peripheral portions, especially on the summits of the hemispheres, and still more in the much-developed Pacchionian granulations, and there commingled with *other* concentrically-laminated bodies, which formed botryoidal masses imbedded in a stroma of immature connective tissue; these bodies, which might, to distinguish them, be termed the 'chalcedonic corpuscles,' were rendered yellow by iodine. . . . . . In several instances I saw minute amylaceous particles (coloured blue by iodine) contained in cells which they only partially occupied."

The differences in locality, and in the abundance of the amylaceous granules in the two brains examined by Mr. Busk, are very striking, and seem opposed to the idea of such particles being limited to any particular regions or tissues. Their peculiarity to nerve-substance or to its ependyma, their non-occurrence on the cerebral surface, or in the meninges, or their prolongations, as at first supposed by Virchow, are hypotheses overthrown by the discovery of amyloid corpuscles upon the choroid plexuses, on the surface of the brain, and in the Pacchionian bodies. Should Mr. Busk's observations be confirmed, the development of an amylaceous material in the processes of secondary nutrition will have a much wider signification than Virchow's original investigations suggested.

We have here purposely omitted reference to the relations, intimated in Mr. Busk's observations, between the production of a starchy material in the nervous centres, and that of brain-sand. Of this hereafter.

Besides those corpuscles in which starch or cellulose has been evidenced by chemical re-agents, numerous others, of various origin, have been enumerated as belonging to the same class, possessing in many cases, however, little in common, except their minuteness and doubtful nature. Foremost among corpuscles approaching corpora amylacea, are those exhibiting concentric laminæ around a nucleus. To such, analogy, in external conformation, led Virchow to first direct his inquiries in search of cellulose, but it proved itself therein an erroneous guide. We have already noted the failure of that diligent student to recognise an amylaceous element in brain-sand; with other concentric globules he was no further successful. Professor Luschka, of Tubingen, records meeting with rounded particles amid the nerve-tubes and ganglionic cells of the Gasserian ganglion, displaying a concentric striation after the addition of hydrochloric acid, which he imagined to be corpora amylacea. He also encountered similar bodies in connexion with the superficial vessels of the cerebral hemispheres. So again, Rokitansky stated, on learning the discovery of concentric and seeming starch corpuscles, that he remembered meeting with not unlike structures in an atrophied optic nerve; also, in a case of atrophy of the spinal cord with diffused, transparent, greyish effusion; in the cerebral substance; and, lastly, in large numbers and of great size, in softened bones (osteomalacia).

Of even more doubtful nature are many of the granules which Meissner would number among corpora amylacea. In fact, some of them, according to his own statement of their vital and chemical characters, are clearly of a different class. He speaks of seeing corpora amylacea (?) in the choroid plexus and pituitary gland; in the acoustic nerve of a deaf and dumb patient; and in the cysts of a polypus of the meatus auditorius. The same observer further states, that he has "often met with concentric corpuscles in great number, and of more considerable size, in nasal mucus; also in synovia, in dropsical fluid,—and not only in that of serous cavities, but in that, moreover, of anasarca They are found likewise in the cerumen of the ear, sometimes in the urine and in pus."

Again, Förster would class with corpora amylacea the corpuscles found in alveolate-cancer; and Wedl, some colloid concentric bodies occurring in hypertrophied heart. Henle contends that certain concentric corpuscles noticed by him in glandular discharges some years since (in 1849), should be admitted into the same category. His original remarks occur in a short paper on what he denominated "Hassall's concentric corpuscles of the blood."* The objects so called, are described and figured by Dr. Hassall,† and their resemblance to starch-grains is very striking; but Mr. Gulliver‡ had previously pointed out the presence of such concentric globules in fibrous clots of the heart, and represented them in his engravings. Henle expressed an opinion that the latter anatomist was altogether deceived in the bodies he saw, and Hassall presumed them to be

* Zeitschrift für rationel. Medicin., Band vii., 1849, p. 411.
† Microscopical Anatomy of the Human Body.
‡ In his translation of Gerber's General Anatomy.

extraneous and entozoal, and probably vesicles of minute algæ, of the genus *Microcystis*, or *Hæmatococcus*.

Now it at once forces itself upon the mind, that, among corpuscles differing among themselves so much both in situation and in histological relations, there can be between many of them no other actual affinity than that of external similarity in rounded form and in concentric lamination; and, therefore, that, to identify them all with corpora amylacea, is a proceeding opposed to the probability of the case. Indeed, of the bodies which some observers would assimilate with the cellulose particles, many have never been chemically examined, whilst others submitted to chemical tests, have afforded results of a contrary character. The only connecting link, as we have already said, between many of the rounded granules enumerated, is that of circular markings; in fact, even this is wanting to some. It is, moreover, a circumstance to which little importance really attaches. For the circular lamination of exuded matter around a central point or nucleus, exemplifies the natural tendency to what MM. Robin and Verdeil designate 'concentric crystallization.'* Those authors use the term with reference to the salts of animal fluids, but we would give it a wider extension, so that it should embrace the phenomena exhibited by all laminated corpuscles, however constituted; whether of saline ingredients alone, or of earthy or other matter and animal tissue, or even of the substance presumed, by Virchow, to be cellulose.

Modern science authorizes our speaking of the crystallization of animal matter;† and there are sufficiently numerous examples to illustrate both the simple union and the chemical combination of animal tissue with mineral, and, we can now add, with vegetable material. We have suggested elsewhere,‡ in an account of brain-sand, the chemical union of the calcareous with the organic basis, whereby the peculiar properties of each are modified. So, again, Schacht points out, that in the Ascidia we have to deal not with pure cellulose, but with cellulose deposited in a nitrogenous membrane, and vitally connected with it; and it is under analogous circumstances that we may suppose the amylaceous substance is present in the human body.

In his paper in the Wurzburg 'Transactions'—(placed first at the head of this article)—written prior to his discovery of cellulose bodies, Virchow gave a very good summary of the various corpuscles related by the circumstance of being laminated and concentric, and to which generally he applied the term *amyloid* bodies. As those therein mentioned were most likely the concentric corpuscles which he examined unsuccessfully for cellulose, and in order to render the list of such particles,—which henceforth will doubtless arrest much attention,—the more complete, we will recount such among them as have not hitherto been noticed. On the serous surface of the female sexual organs, Virchow met with small, concentric "colloid-bodies," having also radiating striæ, and resembling those first seen by Kohlrausch in the kidneys. Others referred to are, concretions of the prostate, of the vesiculæ seminales, and of the veins (Venen-

* Traité de Chimie Anatomique.

† See an able paper on Albuminous Crystallization, by Dr. Sieveking, in this Review, vol. xii., 1853, p. 348.

‡ Original Communications, Art. II.

steine) and granules in the bursæ mucosæ. Between the above and biliary and renal calculi, he also finds an analogy.

To sum up, therefore, concentric lamination, after the manner of starch-grains, is not peculiar to, or characteristic of, corpora amylacea. It is, besides, no necessary feature; for it is not unfrequently absent. just as in the case of starch itself. Indeed, we have obtained the blue reaction with iodine, or with iodine and sulphuric acid, in granules without apparent concentric markings, more frequently than we have discovered corpuscles possessing them. And Mr. Busk has remarked that, though many of the larger ones appeared of a laminated structure, "in others, this appearance, under any mode of illumination, certainly did not exist." The presence of a nuclear point or line, or hilum, is equally uncertain with the lamination, and in no degree characteristic of corpora amylacea.

We must seek, then, in chemical reaction the signs which shall distinguish corpora amylacea from all other corpuscles approaching them in structural characters, and, in the meantime, must be careful to separate all those which, from reasoning and chemical experiment, appear of a different nature, just as is done, by most observers, in the case of the calcareous corpuscles of the brain. The German writers, in their eagerness to follow in the wake of Virchow's discovery, have, as already seen, heaped together imperfect observations on all sorts of granules, and have thereby so encumbered the matter, that, at present, it seems hopeless to endeavour to evolve any general truth relative to the part played by cellulose in the processes of nutrition.

We have just said we must look to chemistry to determine what are corpora amylacea. It is by its employment that Virchow has been led to the discovery of granules having the reaction of cellulose in other than nerve-tissue—viz., in the parenchyma of the spleen; and it is this discovery, as hinted at in a previous page, which has scattered to the wind the several ingenious hypotheses which that persevering observer has, from time to time, raised concerning the histological relations of cellulose.

Virchow writes that, having failed to detect amylaceous matter in the several varieties of concentric corpuscles, he entered on an examination of the human tissues generally, both of the healthy and of the morbid, but met with no evidence of cellulose, until a spleen in that ill-defined pathological state known as fatty- or waxy-spleen, fell under his observation. This diseased condition occurs in cachectic habits of body, especially where there has been prolonged suppuration and exhaustion. According to some, it depends on an albuminous or fibrinous exudation, whilst others describe it as a fatty or true colloid degeneration. Virchow formerly coincided with Schrant in believing the disease to be "colloid," and afterwards, from the chemical reactions of the morbid elements, concluded it to be due to albuminous exudation; but, if his present experiments and views be confirmed, it is no other than a cellulose degeneration. From his latest published researches, there would appear to be two varieties of this seemingly cellulose degeneration, distinguished by the different site of the foreign matter in each.

In the first variety, the transformation occupies the contents of the Malpighian follicles; it advances from periphery to centre, and gives origin to globules of a gelatinous aspect, the size of a pin's head or hemp-seed,

well compared by Christensen to sago-grains in soup. These bodies Virchow was for a long time aware were composed of little microscopic corpuscles, round or slightly angular, quite homogeneous, of a greyish or yellowish hue, packed close together, and, although larger, derived from the metamorphosis of the usual lymph-cells which constitute the contents of the splenic follicles. Nitric acid rendered apparent a granular and fine connective tissue between the grains; when the acid was made hot it coloured the latter yellow, and caustic ammonia then rendered them brown, acetic acid made them pale, and ferrocyanide of potassium being added, produced a granular precipitate between them. It was the knowledge of this behaviour with reagents which started the idea of their albuminous composition; but subsequent experiments with iodine and sulphuric acid brought to light their apparently cellulose nature.

Iodine alone, however, does not give the pale blue tint to these spleen granules which it does to the corpora amylacea, but at first produces a remarkably strong yellowish-red colour, and then the addition of sulphuric acid developes a blue, and afterwards a strong violet colour. An excess of acid, acting powerfully, destroys the violet tinge, and causes a dark brownish red, changing presently to yellow. This transition, and likewise the more rapid operation of reagents upon these splenic globules, than on the corpora amylacea of nerve-matter, Virchow would attribute to their softer consistence.

Besides these important differences in chemical reaction, the splenic granules differ from corpora amylacea in never showing concentric markings. This, however, Virchow considers no argument against the identity of the two; in his apprehension, the same blue colouration by iodine and sulphuric acid together is in itself sufficient to establish it.

Another point made out, of much value as promising great facilities for examination, is the persistence of these spleen corpuscles and their resistance to decomposition. In specimens of the diseased spleen, kept in weak spirit for more than a year, these bodies still made their appearance. So again, recent portions of waxy spleen, macerated under a constantly running stream of water for many weeks, displayed their distinctive colouration with iodine and sulphuric acid even more brilliantly than when not so treated. By this means, corpuscles may be washed out of the tissue and isolated, and their peculiar reaction be clearly ascertained; and Virchow even hopes to hereafter obtain a sufficient quantity to submit to chemical analysis, and thereby to determine whether or no they contain fibrin, the absence of which will render their affinity to vegetable cellulose even more close. The behaviour of the tissue interposed between the granules with chemical reagents convinces him it is of an albuminous nature.

The other variety of diseased spleen, presenting corpuscles having a reaction like cellulose, was met with in a man who had died from necrosis and great suppuration. The liver was congested; the kidneys had suffered fatty degeneration; the spleen itself was much enlarged, very red, firm, and dense, and full of blood; its follicles small and white, and its pulp opaque; when dried, wax-like. Crowded masses of "corpora amylacea" occurred, not, as in the form of waxy spleen previously considered, within the contents of the Malpighian follicles, but in the intermediate spleen-pulp. Iodine

quickly coloured the entire pulp yellowish-red, and sulphuric acid being added, produced a clear blue and violet tint. Here, consequently, was the converse of the pathological state of the spleen before noticed,—the follicles normal, the medullary substance degenerated.

Virchow is not prepared to state how far this cellulose reaction is partaken by other similar gelatinous or colloid corpuscles found in other organs, such as those noted by Wedl* in the intermuscular tissue of an hypertrophied heart, or the concentric cells, portrayed by Schrant, from the optic nerves of an amaurotic patient. But he has tested for cellulose the so-called colloid bodies of the thyroid gland, of the ovary, and of the kidneys, as well as the thick-walled cells in the intervertebral cartilages, and various fatty degenerated parts, yet in vain.

In the remarks hitherto offered we have only superficially treated the subject in its chemical bearings, although a little consideration will show that it is to chemistry we must look for a settlement of "the cellulose question." It must be clearly ascertained whether the reaction of iodine and sulphuric acid with cellulose is peculiar to the latter, or whether any other substance also displays it. H. Meckel, of Berlin, affirms that cholesterin is affected in the same way as the presumed "cellulose" of Virchow, and accordingly attributes to the corpuscles in question a cholesterin nature. To this view Henle assents; but a contrary opinion is advocated by Donders and Busk—viz., that corpora amylacea are actually starch-grains. The questions thus raised must form the subject of a future analysis.

J. T. Arlidge.

Review XV.

Notes on Pericarditis, Endocarditis, and Organic Disease of the Heart and Aorta. By C. Morehead, M.D., and Professor of Medicine in the Grant Medical College, Bombay. 1853. 8vo, pp. 105. (From the 'Transactions of the Medical and Physical Society of Bombay.')

Every contribution to pathological science is acceptable—its value, as in the present instance, may probably be enhanced by the reputation of the observer who presents it, or by the sphere of disease whence it is derived. Our Indian possessions have already yielded a fair harvest to the diligent cultivators. Among these, not the least worthy of honourable mention is the author of the report before us, which will be found to sustain the reputation, for industry and ability, of Dr. Morehead, who thus states his intentions in its preparation.

"In submitting this report, I have had two objects mainly in view; one to add to our clinical knowledge of an important class of diseases; the other to correct the erroneous impression which seems to exist, that acute rheumatism in India is rarely associated with pericarditis or endocarditis."

The opinions here alluded to are those of Drs. Bird† and Chevers. The latter writer says, "there appears to be every reason to believe that rheu-

* Grundzüge der Patholog. Histologie. Wien, 1853, p. 228, fig. 38.
† Lancet, Aug. 1850

matic heart affections must occur very far more rarely in this country (India) than they do in Europe."*

Dr. Morehead's cases were observed in the Jamsetjee Jejeebhoy Hospital at Bombay. A smaller proportion of rheumatic patients are observed in India than in England; the greater number are chronic cases. Many acute cases do, however, occur, and cause heart disease; thus, of the 49 cases of heart affection brought under notice by Dr. Morehead, 27 were clearly traced to rheumatic attacks, and more, also, would probably have fallen under the same category, had the record of all the cases been equally complete. The author remarks:

"It may be that in India acute articular rheumatism is not so common as in colder climates, yet it is by no means of unfrequent occurrence; and the association of pericarditis and endocarditis with it is, I believe, as common in one country as the other.

"Of no rule of practice am I more thoroughly satisfied than that it is as incumbent on the practitioner in India as in Europe, carefully to watch and search for the physical signs of pericarditis and endocarditis in every case of acute rheumatism. If this rule be neglected, the co-existence of these diseases in India will necessarily continue to be looked upon as of rare occurrence."

The data, as Dr. Morehead remarks, are not yet furnished which can justify a comparison between the pathology of the natives of India and that of the diseases of the natives of European countries. So far, however, as a limited number of observations enable us to form a conclusion, the existence of the similarity affirmed by Dr. Morehead seems to exist. An examination of the more important features observed in these cases gives confirmation to the opinion, as will be seen in the following abstract or analysis of the essay in which they are contained. This consists almost exclusively of a detail of clinical facts, so that we cannot do justice either to our author, or our readers, otherwise than by reproducing, in as condensed a form as possible, the contents of this valuable pamphlet.

The report is divided into two parts:

1. The history of 25 cases of pericarditis and endocarditis.
2. The history of 21 cases in which there was structural disease of the heart, and 3 cases of aneurism of the aorta.

We shall follow the author's arrangement of the most important facts deducible from the narratives of the cases in the first category, by considering them under certain heads:

1. *Proportion of Cases of Pericarditis and Endocarditis, and of both combined.*—Of 13 cases recorded as pericarditis alone, 6 are not sufficiently clearly stated to justify the entire exclusion of endocarditis; they are therefore doubtful.

Four were cases of endocarditis alone, affecting the mitral valve in 3, and the tricuspid valve, as believed, in 1.

There were 8 cases of pericarditis and endocarditis combined; in 3 the aortic valves, in 4 the mitral valves, and in 1 both aortic and mitral valves, were affected.

In 7 of the cases the pericarditis took precedence of the endocarditis; in the remaining case the endocarditis was first observed.

* On the Practical Management of Diseases of the Heart, &c. By Norman Chevers, M.D. Calcutta, 1851, p. 38. See also this journal, No. 17, p. 42, in which this opinion is objected to.

2. *Results of the Cases.*—Nine of the 25 cases proved fatal; of these, 8 were in the list of pericarditis, but in 5 of them the coexistence of endocarditis was not disproved; one followed on the two combined. Two of the fatal cases occurred in association with rheumatism; 2 in cachectic habits; 4 were consequent on pneumonia, pleuritis, and phthisis.

From these cases Dr. Morehead deducts the inference, that the prognosis is more favourable in pericarditis associated with rheumatism than under other circumstances. This deduction is, of course, in conformity with the experience of Dr. Taylor and others.

In the 16 cases in which a fatal result did not take place, in 5 no signs of cardiac disease were left behind, and recovery was regarded as complete. In 3 cases the signs of valvular disease were so slight, that they were regarded as probably instances of ultimate complete recovery.

3. *Relation to Difference of Sex.*—The data furnished by the cases under notice are insufficient to justify any attempt at a comparison of the frequency of the disease in the two sexes. They simply show that the proportion was about the same as that of the admission into the hospital—viz., one female to seven males.

4. *Proportion of Cases in different Castes.*—An equal liability to pericarditis and endocarditis appears from these data to exist in the Hindoo and in the native Christian population; and that these affections are twice as frequent among Parsees, and not one-fourth so frequent among Mussulmans. Of this comparative exemption of the Mussulman population, the author can offer no explanation.

5. *Classification with reference to Age.*—The ages of 23 cases only are recorded—viz.: from ten to twenty, 7; from twenty-one to thirty, 10; from thirty-one to forty, 4; from forty-one to fifty, 2. Seventeen of these cases were between fifteen and thirty years of age, of which 14 were in association with rheumatism. These facts also, we remark, are in accordance with the features of these affections as seen in Europe.

6. *Occupations of those affected.*—In 20 cases these were as follow: 2 sailors, 3 servants, 3 hawkers of fruit, &c., 2 beggars, 2 sepoys, 1 baker, 1 labourer, 1 carpenter, 1 grain-seller, 1 schoolmaster, 1 oil-seller, 1 dyer, 1 cook. Sixteen of the twenty followed occupations which more or less led to exposure of the individuals to wet or vicissitudes of temperature. The inference then, that these are its exciting causes, is borne out by the above figures, as well as by the following.

7. *Months of the year in which most admissions took place.*—Nine cases were admitted in the cold months of November, December, January, and February. Fifteen cases were admitted in the rainy season, including the months of June, July, August, September, and October. Of 4 cases admitted in June, 3 were after the 20th, and consequently are correctly classed with the admissions of the rainy season. Only 1 case occurred during the hot season, and this had on previous occasions been the subject of rheumatism.

8. *Relation to Habits of Life.*—Of 5 only is it stated that they were addicted to the abuse of spirituous liquors—1 was addicted to the habit of opium-smoking.

9. *Relation of the Disease to Rheumatism, Cachexia, and Pulmonic Inflammation.* Of the 25 cases, 17 were associated with acute articular

rheumatism. In 16 the rheumatism was present when the heart symptoms appeared, and afterwards co-existed with them. In 1 case the rheumatic symptoms were not present with the cardiac symptoms, which occurred in an individual who had some years previously suffered from an attack of acute rheumatism, and in whom the diathesis, at the period of the attack of pericarditis, may be assumed to have been present. Of the remaining 8 cases, in which rheumatism was not present, 2 occurred in very cachectic states of the system: in 1 the cachexia was distinctly syphilitic; 4 were extension of inflammatory action from the lungs or pleura, and were, with one exception, cases of pericarditis. Two must be looked upon as instances of primary or idiopathic pericarditis.

Of the total cases of pericarditis and endocarditis there was only 1 in which, as far as the record shows, Bright's disease of the kidney was present. In 31 cases of Bright's disease (detailed by the author in the 'Transactions of the Medical Society of Bombay,') there were only 2 in which affection of the heart co-existed with the kidney disease. These data, then, do not show the same relation between Bright's disease of the kidney and pericarditis and endocarditis as the statements of other observers do.

In these cases, the greater relation which subsists between endocarditis and acute articular rheumatism, than between pericarditis alone and rheumatism, is evident. All the cases of endocarditis, single or combined, were, with one exception, associated with rheumatism; whereas, of the 13 cases of pericarditis, 7 were unconnected with rheumatism; and of the 6 cases in the list of uncombined pericarditis, noted as occurring in association with rheumatism, it is not improbable that in 2 of them endocarditis was also present. Of the 2 cases of apparent primary pericarditis, 1 is peculiar in its nature, and is commented upon by the author in his narrative of cases.

10. *Leading Symptoms observed.*—Nothing new is communicated under this head.

11. *Treatment.*—General bleeding was not employed. Local depletion was used in 11 cases. Blisters and mercurials were also employed.

In the second part of the paper Dr. Morehead relates the histories of 21 cases, in which there was old structural diseases of the heart, and of 3 cases of aneurism of the aorta. The following extract will show the lesions, which were found after death:

"Of the 24 cases, 17 proved fatal in hospital, and 2, in all probability, shortly after discharge. Of the 17 fatal cases, an examination of the body after death was made in 16. . . .

"In 11 there was *dilatation of both ventricles of the heart;* in 6, associated with disease of both aortic and mitral valves; in 4, with disease of the mitral valves; and in 1, with disease of the aortic valve alone.

"In 9, there was *dilatation and hypertrophy of the left ventricle.* In these, with 2 exceptions, there was dilatation of the right ventricle also; in 5 of the cases there was disease of both the aortic and mitral valves; in 3, disease of the mitral valve; in 1, of the aortic valve only.

"In 1 case there was *hypertrophy of the right ventricle,* associated with obstructive disease of the pulmonary semi-lunar valves.

"In 4 cases there was *aneurism of the left ventricle.* In all, the opaque state of the endocardium showed that endocarditis had at a former period been present,

and was in all probability the cause of the atrophy and impaired irritability of the muscular fibre, which had led to the formation of the aneurismal pouches. In 3 of the cases there was disease of the mitral valve; in 1, of the aortic valve alone.

"In 7, there was both *aortic* and *mitral valvular disease.*

"In 5, disease of the *mitral valve* only.

"In 1, disease of the *aortic valve* only.

"In 1, disease of the *pulmonary semi-lunar valves.*

"The co-existences of dilatation of both or one of the ventricles of the heart, with their several states of valvular disease, has already been shown.

"In 9 cases the existence of former pericarditis was proved by the presence of *opaque patches on the surface of the heart;* and in 2 of these there were also adhesions between the pericardium and the surface of the heart.

"In 6 cases, there was, in the *opaque condition of the endocardium* of the left ventricle, evidence of the previous existence of endocarditis.

"Both the pericardium and endocardium had been affected in 5 cases.

"In 5 cases there was *effusion of serum,* exceeding two ounces, in the sac of the pericardium.

"In 1 case *rupture of the left ventricle of the heart* had taken place: the muscular fibre in this case had undergone the *fatty degeneration.*

"In 2 cases there was *dilatation* of the ascending portion of the aorta, and in 2 the aorta was *contracted.* In 3 there were thickened patches of *atheromatous deposit* on the inner surfaces of the aorta.

"In 1 case there was *aneurism* of the thoracic aorta, and in 1, aneurism of the abdominal aorta.

"Of the 16 cases examined after death, the state of the *lungs* is not mentioned in the report of 2 of the cases. In 6 cases there was *congestion* of part of the lungs; 5 of these were cases in which there was dilatation of both ventricles—1 dilatation and hypertrophy of the left ventricle. In 4 cases there was *œdema* of the lungs; and in all, dilatation of both ventricles was present. In 4 cases there was more or less serous effusion into the sacs of the pleura, and these were also cases in which there was dilatation of both ventricles—in 3 of the cases the pleural effusion was associated with œdema of the lungs. In 5 cases, old pleural adhesions existed. In 2 cases there were *hepatized nodules* here and there in the substance of the lungs. In 1 case, *tubercles* existed; in 1, *emphysema.* In 1, the lungs were reported to be healthy. In these cases we find the relation between congestion of the lungs, serous effusion into the sacs of the pleura, or into the pulmonary air cells, and heart disease, well illustrated."

In conclusion, we thank Dr. Morehead for this seasonable paper. He has satisfactorily shown that rheumatic fever offers the same sequence of phenomena in India as in Europe; and in so doing he has corrected an error which seemed very likely to creep into our pathological doctrines.

Among the many practical papers which have proceeded from the Bombay Medical Staff, we regard the present as one of the most important. It offers a lesson to the young surgeon entering into the Indian army, which ought not to be neglected, for its perusal will show him, that amidst the unfamiliar forms of disease which his tropical service will give him, he will still have to diagnose and to treat affections entirely similar to those with which his English experience has made him acquainted.

PART SECOND.

Bibliographical Record.

Art. I.—*Six Lectures on the Pathology of Strabismus, and its Treatment by Operation, delivered at the Westminster Hospital.* By C. Holthouse, F.R.C.S.E., Assistant Surgeon to the Hospital, and Lecturer on Anatomy in its Medical School.—*London*, 1854.

Mr. Holthouse's first lecture is occupied with a brief but clear account of the anatomy and actions of the ocular muscles. In describing the action of the orbicularis, it is observed that it can press the eye slightly back in its orbit during contraction, and to this action Mr. Holthouse refers the slight movement backwards of the eye which sometimes occurs in the operation for cataract, and which is usually attributed to the action of the recti muscles. But is not this movement during the operation entirely independent of the orbicularis, as the contraction of this muscle is prevented by the assistant's fingers?

In the second lecture, the phenomena of strabismus are described under the usual headings, of the single and double-convergent strabismus, and the single and double-divergent strabismus.

In the third lecture, the remote causes of strabismus are given, as follows:—1st, Congenital defects of the organ of sight; 2nd, Diseases of the brain affecting the orbital nerves; 3rd, Hypertrophy of a particular muscle from over use, from voluntary squinting, either from imitation or in order to turn away the eye from the light when there is conjunctivitis or ulcer. Mr. Holthouse also alludes to the fact mentioned several years ago by Dr. Radcliffe Hall, that in some cases of single-convergent strabismus, the inner rectus of the squinting eye is much smaller than the corresponding muscle of the eye which is not squinting—i.e., is not turned inwards. Mr. Holthouse gives Dr. Hall's explanation—viz., that in such cases the squinting eye being very inferior in power, the sound eye has to do all the work, and therefore its *abductor* muscle is constantly called into play to counteract the hypertrophied inner rectus. The consequence is, that by consensual action the abductor of the squinting eye is influenced with the abductor of the sound eye.

The immediate or proximate causes of strabismus form the subject of the fourth lecture. The reason why impaired vision should produce strabismus does not, according to the author, sufficiently appear. Disease of the nervous centres may lead to squinting, either from paralysis or spasm—the latter cause being, however, rather inferred than proved. Some cases are also referred to in which there was paralysis of the ex-

ternal rectus, from pressure on the sixth nerve. The action of the other great cause of squinting—viz., hypertrophy of one of the recti (most commonly the internal rectus) from over use, is evident.

The causes of the subjective phenomena of strabismus are discussed in the fifth lecture. In strabismus the sight of the squinting eye is frequently, though not always, impaired. This has been attributed to disease of the eye; to compression of the optic nerve through the recti muscles; or to the action on the optic nerve of the same cause which produces the squinting. Mr. Holthouse does not agree in the first explanation, arguing that vision is often regained at once by division of the muscle, and that in cataract the visual power of the now disused retina may remain unaffected. Mr. Holthouse dissents *in toto* from the second explanation, suggested by Mr. John Adams, and thinks it highly improbable that any contraction of the recti muscles should be able to compress the optic nerve. The third cause of diminution of vision he believes to be the true one, and thinks, either that there may be disease of the nerve or brain, or that the dioptric parts of the eye have undergone some change in form by muscular action, so that too much, too little, or irregular refraction, is produced. It is only, he thinks, on this supposition, that we can explain the *immediate* improvement in vision which takes place when the muscle is divided, and the squinting removed.

The last chapter is on the Treatment of Strabismus. A few directions are given as to when the operation should *not* be performed. After describing the operation as commonly performed, the author states that he prefers the sub-conjunctival division of the muscle by means of a bistouri caché, as recommended by Guerin.

The causes of failure of the operation are then considered, and especial attention is directed to the great breadth of the insertion of the internal rectus, some portion of which is liable to be left uncut. The other causes of immediate or remote failure, such as adhesions of the ocular fascia and muscle to the eyeball, re-union of the ends of the muscle, adhesion of the cut end to a fresh point on the sclerotic, or contraction from cicatrization of the wound, are described.

We have now given a brief outline of these lectures, from which our readers may gather that this little work treats the important subject of strabismus in considerable detail, and in an able manner.

ART. II.—*Traité Clinique et Pratique des Maladies des Vieillards.* Par M. DURAND-FARDEL, M.D.—*Paris*, 1854. pp. 876.

Clinical and Practical Treatise on the Diseases of Old Age. By Dr. DURAND-FARDEL.

THE title of this work is scarcely a correct one; it is a treatise on the practice of medicine, only the influence of age on the several diseases is put prominently forward.

We cannot say that we think the author has done wisely in writing such an enormous book. What there is specific and peculiar in the diseases of old age might surely be communicated by itself, without a complete discussion of the disease as seen at all ages. No less than 334 pages are

occupied with diseases of the encephalon: and, although some new matter has been introduced, a very great portion of this is simply an abstract, or a repetition, of the author's 'Treatise on Softening of the Brain,'* which in many parts has been copied to the letter: as, for example, in the chapter on the Diagnosis of Cerebral Hæmorrhage, which is really nothing but a slightly altered copy of the chapter in the earlier work, on the Diagnosis of Softening. In the chapter on Cerebral Hæmorrhage, which is in great part new, the author abandons altogether his avowed object, and has written a complete treatise on the subject of cerebral hæmorrhage occurring at any age.

In the latter part of the work, on the Diseases of the Respiratory, Digestive, and Urinary Organs, this great fault of extension of the subject beyond its proper limits is less observable. Still even here the diffuseness of the style is a little wearisome. We should not do justice to this work, however, if we did not at once admit, that, as might be expected from the great reputation of its author, it is a valuable treatise.

ART. III.—*Mikroskopische Anatomie oder Gewebelehre des Menschen.* Von Dr. A. KÖLLIKER, Professor der Anatomie in Würzburg. Zweiter Band. Zweite Hälfte, 2 Abtheilung (Schluss).—*Leipzig*, 1854.

Microscopic Anatomy. By DR. KÖLLIKER. (The second and concluding part of the second half of the second volume.)

THE smaller "Handbook," by Professor Kölliker, which has been partly issued by the Sydenham Society, has of course to a considerable extent anticipated the section of the larger work now before us.

The kidneys, the genital organs, the vascular system, and the organs of the higher senses, are treated of in this part, and with it the most important half of the whole work, the doctrine of the special tissues, is brought to a close. The first volume has yet to be published.

The admirable edition issued by the Sydenham Society, and the notes of the accomplished editors, render it unnecessary for us to go at length into a critical survey of the present volume. We may observe only, that, as usual, every page bears marks of the untiring industry, and uncommon powers of research of the author, and that, like the former parts, the work is well printed, and is illustrated by excellent woodcuts.

ART. IV.—*Index to the Catalogue of the Library of the Royal College of Surgeons of England.*—*London*, 1853.

A LIBRARY without a catalogue is like an army without a general. But, in a large library, a good catalogue is so extensive, that it requires no little skill to use it. We open it, and find ourselves in a sea of words, without chart or guidance to carry us to our end. The catalogue itself then demands a catalogue, if we are to employ the means it indicates usefully and expeditiously.

The splendid library at the College of Surgeons has recently been

* Traité du Ramollissement du Cerveau. Paris, 1843.

enriched by an "Index to the Catalogue," which is really almost an index to medical literature. By its means any one may find the names of the authors who have written on any special subject: provided, of course, that those works are in the library at the College. A quotation will make the plan of the work understood. We will suppose that we require to refer to a particular subject, say Fracture of the Femur. We turn to Femur, and find the following passage:—

"*Femur, fracture of the* (in general), Amesbury; Brunninghausen, H. Earle, Freytag, Gresely, Nusche, Solzmann, Sauter, Schurmayer (see Fractures).

"*Of the Cervix.*—C. Bell, A. Cooper, Duverney, Flach, H. Earle, Hagedom, Loh, C. G. Ludwig, Mayor, Schellhorn, Szrlecki, Ulrich, J. Wilson (*complicated with dislocation*), Haase.

"*Absorption of the Cervix.*—B. N. Bell."

We thus see the names of the authors, and then, by reference to the large catalogue, the case and shelf on which the book is placed are shown. Much labour must have been bestowed on this Index, but it is labour well applied.

ART. V.—*Result of an Inquiry into the invariable existence of a Premonitory Diarrhœa in Cholera.* By DAVID MACLOUGHLIN, M.D.—*London*, 1854.

DR. MACLOUGHLIN believes that in all cases of cholera "a diarrhœa precedes for a few hours, or for a few days, or for a few weeks," the attack of cholera, and that this diarrhœa is not essential to the disease.

The first statement is made on the authority of an investigation extending, we are informed, over many thousand cases, in none of which has diarrhœa ever been absent. In order to complete this inquiry, Dr. Macloughlin has taken the trouble of examining closely into all cases of cholera which are stated in the returns of the Registrar-General not to have been preceded by diarrhœa. If any such case is reported, he visits the house in which the death has occurred, and tells us, that he invariably finds either that the medical attendant had wrongly reported the case, and that diarrhœa *had* pre-existed, or that the case had not been one of cholera at all.

In entering on such an inquiry as this, it is necessary exactly to know what is meant by the term "premonitory diarrhœa." We suspect that Dr. Macloughlin and some of his opponents would find that, in many cases, the difference of opinion arose entirely from a difference in the interpretation of terms. Dr. Macloughlin says a painless diarrhœa precedes the "vomiting, *purging*, and cramps," and he believes that he can distinguish between the diarrhœa which precedes the cramps from the diarrhœa which occurs during cramps. As we conceive this to be impossible, and as the chemical nature of the transudation before and during cramps only differs by the admixture of the contents previously in the bowels during the former period, we should object to the phrase that "premonitory diarrhœa precedes the purging of cholera." But if this "painless diarrhœa" is not different from the purging of the developed [choler]aic stage, what right has it to be called "premonitory diarrhœa," [and] spoken of as distinct from cholera? Is it not the first symptom of

cholera itself, and premonitory only of other symptoms, such as cramps? We know this is a debated question, and that it is difficult to think that a diarrhœa which can be arrested so easily, is of the same nature as the disease, before the developed stage of which human art is powerless: but with our present knowledge of the transudation processes in cholera, we are inclined to think that the term "premonitory diarrhœa" is merely an hypothetical expression, and that the proper wording of the facts should be "diarrhœa is (usually) the first symptom of cholera, and after lasting for some hours, or days, is followed by cramps and vomiting."

Then comes the question, whether there are not some cases of cholera in which symptoms quite characteristic of the disease occur as early as the diarrhœa? Taking Dr. Macloughlin's extensive series of facts, we are compelled to say that as far as cramps are concerned, they have been found in nearly 5000 cases to be posterior in point of time to the purging. We do not see that any other or stronger conclusion is warranted by these facts. Then, as to the shortest time which intervenes between the first stool and the first cramp, we find that in the second case investigated by Dr. Macloughlin, there was a painless (so called premonitory) diarrhœa for three hours before the cramps (p. 33), and in case three (p. 34) the cramps came on one hour and a half after the first stool.

But it does not follow from Dr. Macloughlin's facts, that in the cases investigated by him other symptoms, equally or more characteristic than the cramps, may not have occurred as early as the first stool. A slight failure of the circulation, and some diminution of animal heat, a peculiar appearance round the eyes—in fact, the earliest traces of those formidable symptoms which, when developed, form the stage of collapse—may, for all Dr. Macloughlin can say, have been present in cases two and three, or in others, and may indeed have even preceded the diarrhœa.

While we thus freely express our opinion that Dr. Macloughlin would have avoided some misconception, had he defined more clearly the terms used by him, and the exact nature of the problem sought to be solved (which really was the relative priority in point of time of two symptoms, diarrhœa and cramps), we cannot refrain from expressing our sense of the energy and perseverance which has led him to this inquiry. He has given a larger number of facts on the point than any other observer, and is entitled to the greatest credit for the investigation.

One fact appears from Dr. Macloughlin's inquiries. In 21 cases, reported by the Registrar-General, as cholera, he found no less than three (or 14·28 per cent.) were not cases of this disease.

ART. VI.—*Orr's Circle of the Sciences; a Series of Treatises on the Principles of Science, with their application to Practical Results. Organic Nature*, Vol. I.—*London*, 1854.

IN addition to an introduction, the volume before us includes the following subjects:—the physiology of animal and vegetable life; the principal forms of the skeleton, and of the teeth, and the varieties of the human species. The first is by the editor, Dr. Bushnan, the second by

Professor Owen, the third by Dr. Latham. The work is illustrated by 365 engravings.

The physiological department has been ably treated, under the following heads:—the elements of organic bodies; the textures; circulation; digestion; respiration, reproduction, and the functions of relation. This is a good popular arrangement, and the execution of the work is equal to the design. There is, perhaps, too great an employment of technical terms before the reader is prepared for them, but the description is in general so clear, that an attentive reader can have little trouble in surmounting this little difficulty.

Professor Owen's section is, of course, an admirable scientific production, but it is decidedly too laboured. It would be good tough reading for any one, and can be scarcely intelligible to a beginner.

We must also find, to a certain extent, the same fault with Dr. Latham's chapter. It is too deep and too dry for the class for whom we conceive this book to have been written, though well adapted for those who are already a little acquainted with the subject.

The work altogether, however, is so excellent, and contains such rich stores of knowledge, that it is scarcely just to find any fault, especially such a one as we have now indicated, which has arisen, no doubt, from anxiety to treat each subject as fully as possible.

Art. VII.—*Summary of New Publications.*

Our supply of books this quarter has been below the average. In addition to those already noticed, we have received only the following:

In *Medicine*, the most important work is M. Delasiauve's prize essay on 'Epilepsy;'* a work of considerable research and judgment. We shall insert an analysis of it as soon as possible. M. Racle has published a treatise on 'Diagnosis,'† of which we can speak very highly.

A French work has been published by an American,‡ Dr. Flint. We have had for some little time by us the 'Clinical Report on Fever' by this physician, of which the treatise before us is an abstract. We shall soon review the whole subject, and these works will receive due notice. Dr. Peddie has published an interesting paper on 'Delirium Tremens,' in which the treatment of the disease by moderate doses of antimony, without stimulants or opium, is very strongly advocated, and supported by well-reported cases.

A treatise on 'Auscultation' was published in 1849 by Dr. Weber, of Kiel, which has been now translated by Dr. Cockle, and has also received from that gentleman certain additions. The work, to which reference has been made several times in our pages, is one of great merit, and we are glad to see it translated. Dr. Cockle has performed his task well, if we may judge from a comparison of about twenty pages of the original and translated work. There are, here and there, some phrases at which we could

* Traité de l'Epilepsie, par le Dr. Delasiauve. Paris, 1854.

† Traité de Diagnostic Médical, par le Dr. V. A. Racle. Paris, 1854.

‡ Résumé de Recherches Clinique sur la Fièvre Continue, la Dysenterie, et la Pleurésie Chronique, par Austin Flint, M.D.

take exception, but the general excellence of the translation makes us loth to be hypercritical. The additions made by Dr. Cockle are from the works of Böck and Piorry; those from Böck's work on 'Diagnosis' are, for the most part, useful, but we wish he had spared us some of the diagrams from Piorry's 'Atlas,' and all the elaborate markings and the atrocious nomenclature of that able but eccentric physician.

Dr. Granville's treatise on sudden death will be reviewed in our next number. A review of Dr. Winslow's excellent Lettsomian lectures on 'Insanity' is in type, but has been unavoidably postponed.

The works of Galen, with additions from MSS., are being translated by the celebrated savant, Daremberg. The first volume only has yet appeared, but it is needless to say that the work will be a classical one.

Mr. Pearce has published a popular but sensible hygienic work on the 'Treatment of Diseases of a Sedentary Life.'

Few new publications have reached us on cholera. The notification of the Board of Health of Jamaica has been reprinted in this country by order of the Colonial Secretary, and is a very sensible production. We would take this opportunity of expressing our regret that the pressure upon our space has hitherto prevented our noticing Dr. Milroy's excellent 'Report' of the cholera in Jamaica. We have not, of course, lost sight of it, and shall take care to do it justice.

Mr. Tucker, the well-known Secretary of the Epidemiological Society, has published a paper on the use of acids in cholera, and Mr. Grove has proposed to use sulphur in the same disease. Both pamphlets are interesting and suggestive, but no evidence as to the use of acids is added to what is already known, and Mr. Grove's recommendation of sulphur is so far unsatisfactory, as he appears in every case to have combined carbonate of soda with it. Dr. Ayre has written a letter on the calomel treatment, as he believes his plan has not been properly dealt with by Dr. Gull in the College Report. As we shall probably have other evidence on this subject, we defer all comment.

A treatise on 'Hooping Cough,' by Dr. Gibb, shall receive notice in our next number.

In *Surgery*, we have received nothing but reprints of papers. Among these we may mention two pamphlets on the 'Physiology of the Tympanum,' one by Mr. Pilcher, the other by Dr. Jago, of Truro, both of which will well repay perusal.

In *Midwifery, and the allied subjects*, we have before us an able work by Mr. Baker Brown, for a review of which we shall find early room. The second edition of Von Siebold's 'Lehrbuch der Geburtshilfe' has appeared; it contains 386 pages, and is an useful book. A little treatise on the 'Diseases in the Fœtus in Utero,' by Dr. Madge, possesses many good points; too much space, however, is occupied with an elementary account of the development of the fœtus, and the detail of the various diseases is sketchy. We shall notice the book, however, at greater length, as it appears probable that other works on the same subject will soon appear.

In *Anatomy*, the sixth edition of Mr. Erasmus Wilson's 'Vade-Mecum' has been published. The author acknowledges in his preface the assistance he has received in the preparation of this edition from Professor Retzius, of Stockholm. The illustrations are excellent.

In *Physiology*, we have to mention a work by M. Flourens on the 'History of the Discovery of the Circulation,' which appears to be, as far as we have examined it, a good account of the subject. Mr. Struthers has published an interesting volume, entitled 'Anatomical and Physiological Observations.' Most of the papers are reprints from journals (our own among the number), and are of great value and interest. We shall have occasion to refer to more than one of them hereafter.

In *Materia Medica*, the American 'Dispensatory' of Drs. Wood and Bache has passed into the tenth edition. A very useful work, called 'A Manual of Practical Therapeutics,' has been written by Mr. Waring, of the Indian army. It is intended to give, as briefly as possible, the opinions of the standard English writers on the therapeutic employment of each article of the materia medica.

In *Botany*, we have only to notice a work by Dr. Spencer Thomson, entitled 'Wanderings among the Wild Flowers.' It is, in fact, an elementary treatise on botany, and is extremely well written and arranged. We have seen no better book for beginners, and older botanists will find instruction and pleasure in the graphic descriptions contained in it.

Under the head of *Miscellaneous Subjects*, we may observe that we have received treatises 'On the Climates of Nice and Spain,' by Dr. Lee, and two pamphlets 'On the Climate of Madeira,' by Dr. Lund and Mr. Bloxam. We regret that these all reached us after the review 'On the Climate of Spain and Australia' was in type. The two treatises on Madeira are intended to reply to some statements made by Dr. Burgess on that climate. Both writers believe that Madeira has been hardly dealt with.

We are happy to say that the 'Micrographic Dictionary,' by Drs. Griffiths and Henfrey, is appearing regularly, and that the contents of the second, third, and fourth, sustain the high character we gave of the first part. If the work is carried on throughout in the same way, it will be by far the most valuable one of its kind.

We recommend to our readers a very interesting paper on 'The Effects of Civilization on the Fortunes of the Medical Profession,' by Mr. Dayman. It was read before the Medical Society of Southampton, and is printed at their request. It contains many fine thoughts, well expressed.

Sir George Ballingall has reprinted the lecture which he delivered at the opening of his course of military surgery at Edinburgh. It gives a history of the untiring efforts of this eminent officer and teacher to obtain a due recognition of the importance of his subject, and is full of the enthusiasm and earnestness which have always distinguished Sir George Ballingall. Like an old war-horse, he rouses up at the sound of the cannon, and even seems to blame himself that he has not, ere this, started for the banks of the Danube. It has grieved us, however, to read the list of ailments which tie him to his professorial chair: "a lame hand, from a painful and anomalous affection of the fingers; an impaired eye, from a recent attack of ophthalmia; and, above all, a load of 68 years, are miserable qualifications for a campaign in Turkey." In spite of these ailments, we trust that many years of usefulness are yet in store for Sir George Ballingall. If it were not so, his country and his profession would be great losers.

PART THIRD.

Original Communications.

Art. I.

On the Peculiarities in Figure, the Disfigurations, and the Customs of the New Zealanders; with Remarks on their Diseases, and on their Modes of Treatment. By Arthur S. Thomson, M.D., Surgeon of the 58th Regiment of Foot.

(*Continued from No. 26, p. 502.*)

The Diseases of the New Zealanders.—I have heard it mentioned in New Zealand, that one of the greatest misfortunes which can occur to the inhabitants of an unknown island in the Southern Ocean, is its discovery by some civilized navigator. This painful reflection entirely refers to the misery the people suffer from the introduction of bad habits and new diseases.

However much some men may object to the above opinion, there can be no doubt that the progress of European colonization, in every country situated within the temperate zone, has produced a partial or total destruction of the aboriginal races. In tropical countries, where the heat of the climate prevents the white man from cultivating the soil with his own hands, the indigenous races, unless actually destroyed, have generally kept their own ground. In New Zealand, where, from the first, a just, generous, and benevolent policy has been adopted towards the natives, it is hoped their extinction will not occur; but there are certain mournful facts which would lead us to infer that the New Zealand race—far elevated in virtues, although debased by many vices, above other races—will furnish another proof of the apparent blight which civilization produces; and men who are fond of prophecy have already foretold, that before a century has elapsed the aborigines of New Zealand will not, in numbers, be a tithe of what they are at present.

Good men in England have attributed the frequent extinction of certain aboriginal races to the cruel conduct, and the unchristian treatment, of the early settlers among them. The hands of the white men in America, Van Diemen's Land, New Holland, and Algeria, may not be clean from this imputation; but not so the pioneers of European colonization in New Zealand. It is, indeed, one of the objects of this Memoir to place on record, before years have placed proof out of the question, that the decay of the New Zealanders is not the work of the early settlers; on the contrary, they have stood before the destroyer, and have endeavoured, with some success, to prevent the destruction hastening on: nor can the decay be laid at the feet of advancing civilization, but chiefly to a violation, on the part of the New Zealanders themselves,

of those natural laws which God has made for the propagation and increase of the human species.

In. a few words, I may state that the present generation of New Zealanders violate the laws of nature by promiscuous sexual intercourse with the females at a very early age, by infanticide, chiefly of females, by neglecting the sick, by intermarrying with near and scrofulous relatives, by using bad and poor food, and by living in a temperate climate as if it were a tropical one.

These circumstances produce a great amount of sterility among the women, a large mortality among the children, and an extraordinary prevalence of the scrofulous diathesis.

In order to convey to the mind some definite idea of the comparative frequency of different classes of disease among the New Zealanders, I have drawn up the following table, to which I shall occasionally refer. It affords, I am aware, a rude comparison, but I conceive it will not be found destitute of usefulness in illustrating the following memoir.

It is necessary to bear in mind. that all the diseases among the New Zealanders are classed from symptoms. No post-mortem examination has been made in any of the hospitals for fear it should create a disturbance, and deter the sick from applying for relief.

TABLE I.—*Showing the Comparative Frequency of certain Classes of Diseases among the Inhabitants of a large town in England,* and the Natives in New Zealand.†*

Classes of disease.		Number of cases presenting themselves for treatment in the English Infirmary.	Number of cases presenting themselves for treatment in the New Zealand hospitals.	Proportion among each race. Out of 1000 cases of disease, there were— English.	New Zealanders.
Fevers		390	190	20	74
Diseases of the lungs		2165	435	109	169
Diseases of the liver		228	...	12	...
Diseases of the stomach and bowels		1418	304	71	119
Diseases of the brain		1031	15	52	5
Dropsies		451	2	23	...
Rheumatic affections		2365	495	119	191
Venereal		86	99	4	38
Abscesses and ulcers		2195	278	111	108
Wounds and injuries		1852	89	92	34
Diseases of the eyes		703	91	35	35
Diseases of the skin		801	181	45	70
Scrofula		1173	210	59	82
Eruptive fevers		...	...	...	...
All other diseases: Asthenia	1156				
Tumours	191				
Caries	218				
Cachexia	171				
Hernia	324				
Hydrarthrus	144	4998	191	248	75
Dysuria	110				
Amenorrhœa	325				
Menorrhagia	107				
Bronchocele	191				
All other diseases	1969				
		19,866	2580	1000	1000

* Compiled from a Synopsis of Medical and Surgical Cases at the Sheffield General Infirmary during 22 years, by Robert Ernest, M.D. It is a small pamphlet (14 pages), and is republished in the first volume of Farr's Annals of Medicine, 1837.

† Compiled from the Return of Native Diseases treated in the Colonial Hospitals, &c., as appended and marked Table No. II.

This table is thus read:—Out of 19,866 cases of disease at the Sheffield Infirmary, 390 were fevers; out of 2580 cases of disease among the New Zealanders, 190 are febrile maladies. Among the English this is about 20 cases of fever for every thousand cases of disease; among the New Zealanders, 74. The diseases which are included in the different classes may be seen in Tables II. and III., appended.

On the Frequency of Febrile Diseases.—The climate of New Zealand has no tendency to produce fevers; but the small and badly ventilated houses in which the aborigines sleep, the poor diet they use, their dirty habits and insufficient clothing, are the remote and predisposing causes of the febrile attacks to which they are subject. In some of the cases complications exist, and produce death. Generally the attacks are mild, but occasionally a low typhoid type is met with. Out of 50 cases of fever registered and admitted into hospital, 4 proved fatal. The doctrines of contagion and infection from this class of diseases are unknown among the aborigines, and although there are to be found traditions of several fatal epidemics, none appear to have been fever. I have not seen a case of remittent or intermittent fever among the New Zealanders, and Dr. Rees, who has been resident for ten years near a populous pa (village) on the banks of the Wanganui river, has never seen one either. In 1847 a fever broke out in St. John's College, near Auckland, the result of bad drainage; and Dr. Davies saw a decided case of remittent fever, which assumed a typhoid type and proved fatal, in a New Zealander. In a small pa, situated in one of the swampy parts of the valley of the Thames, Dr. Johnson, the late Colonial Surgeon, in 1847, heard of several cases of a kind of remittent fever. In the native language there is a term for a disease which is accompanied by shivering—but this symptom may occur during the progress of other diseases. Slight attacks of ague may occur, but they are seldom seen.

Eruptive Fevers.—Small-pox, measles, and scarlet fever, have not been seen among the New Zealanders. That they are susceptible of the poison of small-pox is obvious from the violence with which their constitutions are affected by the vaccine lymph, and from the circumstance that the lymph, after passing through their bodies, is much more powerful than that obtained from a European arm. I vaccinated several soldiers successfully with lymph taken from a New Zealander's arm, who had been many times before unsuccessfully vaccinated from a European child's arm. The vaccine operation is accompanied with slight fever, and the vesicle is often large, and occasionally ulceration of the part occurs. In 1848, scarlet fever appeared for the first time in New Zealand, in the town of Auckland, but with the exception of affecting a few half-caste children, and a native of Tahiti, it confined itself to the European population. A few cases, I have been told, occurred in a native village near Auckland. That the New Zealanders are liable to be affected with measles is obvious, from the circumstance that the one who lived in England under the care of Dr. Traill, of Liverpool, was attacked with the disease. Neither small-pox nor measles have appeared among the European population in New Zealand, but varicella has.

It is very remarkable that in New Zealand, where the temperature is for many months about 60° Fahr.—where the uncultivated land is

covered with thick wood and fern, up to the very door of a New Zealander's hut—where the moisture of the climate is great—that diseases which are attributed to marsh poison are almost unknown. Even Europeans who have lived for years on the alluvial soil on the banks of the Waipa and Waikato rivers, and in the low town of Kororarika, have scarcely ever contracted ague; and Europeans who have suffered from ague in tropical and other countries, have recovered from the malady after a few years' residence in New Zealand. This exemption from remittent and intermittent fevers I attribute to the shape of the island, the high winds which blow over the narrow land, and to the volcanic nature of the soil allowing the rain to percolate quickly to a considerable depth.

Diseases of the Lungs.—This class of diseases is much more frequent among the New Zealanders than the English. I do not place any reliance in the number of specific diseases, but on the great prevalence of cough and other symptoms indicative of irritation within the chest. The fatal attack may commence as pneumonia or catarrh, and many of them are cases of chronic catarrh; but the symptoms found on the approach of death are all those which accompany what is called "consumption." I do not say it is tubercular. All ages seem equally liable to the disease. Spitting blood is common, and is known as a very fatal symptom; influenza and hooping cough have been once epidemic during the last four years; the latter appears to have been a new disease among them. The sudden prostration of strength, which is so characteristic of the invasion of influenza, was observed among the New Zealanders. Asthma, the result of other diseases, is frequent. Pneumonia is a less acute disease in a New Zealander than a European, and consequently is more obscure. Medical treatment in hospital affords much relief to natives suffering under consumption, but most of the cases when brought into hospital are in an advanced stage, a period when relief is the only object in view.

The great prevalence of diseases of the lungs does not arise from the climate, but from causes peculiar to the New Zealanders themselves. This I assume from the comparative rarity of cough and consumption among the European population in the island. It is not the bodily shape of the New Zealanders which produces the disease, for nature has given them ample chests; I measured the girth of the chests of 151 New Zealand men, and found it thirty-five inches, which measurement is not inferior to that of Europeans, and I found healthy persons could distend much more easily than Europeans Dr. Arnott's breath measure.

The causes of the frequency of diseases of the lungs among them are, their poor diet, badly ventilated houses, insufficient clothing, and migration from a tropical to a temperate climate. These subjects I shall more particularly notice under the head of scrofula.

Diseases of the Liver.—This organ is rarely diseased; at first I thought that hepatic affections might be overlooked, but when I found medical men who had been practising for years without having met with a case of jaundice, I then came to the conclusion that liver complaints are a rare disease among the New Zealanders. Jaundice is, however, not unknown, for I have heard of three cases. As Europeans resident in New Zealand are as liable to affections of the liver as in England, I attri-

bute the rarity of the disease among the New Zealanders to their not using any fluid containing alcohol, the injurious effects of which, when taken to excess, or in habitual moderation, on the functions of the liver are now well known and appreciated.

Diseases of the Stomach and Bowels.—It will be seen on referring to Table I., that this class of maladies is much more frequent among the New Zealanders than among the English, although the immediate fatality is not in proportion to the frequency. Diarrhœa is the most common disease, but almost every affection of the stomach and bowels has been under treatment. The maladies under this head are very amenable to hospital treatment, not from the medicines given, but from the change of diet, and removal from the exciting causes of the diseases. Affections of the stomach and bowels are often the remote causes of scrofula and other complaints which terminate fatally among the New Zealanders. The symptoms of the different diseases do not vary much from the symptoms observed in similar attacks among the English, if I except a less acute type. The exciting causes of many of the diseases under this head, are excess in eating food, often bad in itself, and badly cooked, long abstinence from food, cold, exposure, and wet. It has been said that dyspepsia is a disease of civilization, but a glance at the foregoing list of diseases will show that this is a popular error. Worms in the intestines are seen in adults.

A large proportion of this class of diseases might be prevented by avoiding the use of bad food. In some districts where wheat is cultivated, and the habit of eating maize and potatoes in a state of decay is less common, the number of patients affected with diseases of the stomach and bowels have decreased. Gluttony is often the cause of diarrhœa. I have seen a native eat, I am sure, ten pounds of potatoes in a very short time. Fern-root produces constipation. Traditions state that two fatal epidemics, having a dysenteric character, visited the island many years ago.

Diseases of the Brain.—It will be seen in Table I., that this fatal class of diseases are not often met with amongst the New Zealanders. Sanguineous apoplexy, so as to produce either death or paralysis, is seldom seen; but I can easily imagine that some cases of apoplexy must now and then occur; of two cases I have heard about, one was admitted into the Colonial Hospital at Auckland, in December, 1851; the patient was an old emaciated man, who when working was suddenly seized with giddiness, and fell down; when brought to hospital next day, one side of his body was slightly paralytic, and he died two months afterwards. The other case of apoplexy was in a woman, who lived with a whaler, and shared with him his food, and probably his grog. I have heard of one or two natives having died suddenly when in a state of excitement, but whether this was produced by apoplexy, or disease of the heart, or aneurism, I cannot say, for as rheumatism is common, organic disease of the heart must now and then occur. I can easily imagine a case of apoplexy being produced by too great a distention of the stomach with food, and men have died after a cannibal feast.

The small number of cases of apoplexy I attribute to the New Zealanders not using wine, spirits, or beer, as common drinks, the use of

a vegetable diet, and from not indulging in the luxurious habits of eating food which are so common among persons in easy circumstances in England; and a little is also to be attributed to their bodily conformation.

Paralysis.—With the exception of the above case, I have heard of no person being affected with paralysis. There are several natives affected with wasting of the muscles of the limbs, the result of rheumatism and paralysis of the lower extremities from curvature of the spine; but paralysis, the result of cerebral disease, is almost unknown. No case of paralysis agitans has been seen, nor of that strange malady, chorea, or St. Vitus's dance.

Insanity and Idiocy.—These diseases are now and then seen, but they are, comparatively speaking, rare. In the extensive district of Poverty Bay, out of 2145 persons, there were, in 1849, two idiots and one insane person;* and at Taurangi, in the Bay of Plenty, in 1849, out of 2411 souls, there was no insane or idiotic person.† Temporary fits of insanity, the result of chronic and acute disease, and melancholy often leading to suicide, and produced by superstition, are occasionally observed; but the above statistical data from very extensive districts shows that true insanity and idiocy are rare, when contrasted with the fact, that among the Quakers in England there is tolerably good evidence that 3·4 per thousand, or one out of every 333 persons, are insane.‡

Most cases of idiocy result from some peculiarity in the shape of the skull, which it is not in human power to prevent; whereas insanity is not only the product of bodily conformation, but of society. Most of the cases of insanity I have heard about among the New Zealanders may be referred to the shape of the head, mechanical injury, old age, or superstition: all of which causes, with the exception of the last, it is not in their power to prevent; while among the English, a large proportion of the cases of insanity arise from immorality, violent illusions, obstinate passions, and diseases, the remote and proximate causes of which are intemperance. The higher faculties of the mind are uncultivated and neglected among the New Zealanders, which circumstance may contribute much to diminish the tendency to insanity: nevertheless, the rarity of insanity among them ought to teach us a lesson, that many of the attacks of this painful disease are the result of our own wilful and unbridled passions.

There is one New Zealander in the Auckland Lunatic Apartment, who has been "mad" several times. The disease is produced by excessive intemperance in spirits. His tribe lives at a distance from Auckland—from them he escapes to Auckland, where he obtains spirits, sometimes by fair, at other times by foul means, until he gets into the "horrors" (delirium tremens), and attempts to destroy himself; a few weeks' detention, and no spirits, restores him. It is the only instance I have ever heard of a strong desire for spirits among the aborigines.

Epilepsy.—As no patient affected with this disease was admitted into hospital, I took some trouble to ascertain whether the disease has been seen among the New Zealanders. I thought the malady did exist among

* Communicated to me by the Very Rev. Archdeacon Dr. William Williams.

† Communicated to me by the Rev. Mr. Davis, Taurangi.

‡ McCulloch's Statistical Account of the British Empire, vol. ii. p. 607.

them, because, in their own language, there is a term for a disease, the chief symptom of which is falling down without any perceptible cause; but as this term is employed when a person faints, and as I never could meet with a medical man, nor a European, who had seen a native with epilepsy, nor a native who could describe the disease, I am inclined to think it does not exist among them; or, if it does, it must be very rare.

The exemption of the New Zealanders from epilepsy is worthy of the most particular attention. The causes which are said to predispose to this disease are hereditary predisposition, sanguine and plethoric habit, great activity of the mental faculties, residence in a cold and moist climate, masturbation, intemperance, and a scrofulous constitution. None of these predisposing causes are found among the New Zealanders, with the exception of the last, a circumstance which tends to prove that they are the true predisposing causes of epilepsy. It has been surmised that there is some connexion between the convulsions of infancy, and the epilepsy of mature age; but the children of the natives are subject to convulsions, and not to epilepsy, a result which is opposed to this theory. I have never heard of a woman having puerperal convulsions; perhaps there is some connexion between this and epilepsy. Epilepsy cannot often have its origin from mal-conformation, or injuries of the brain, otherwise the disease should have been seen among the New Zealanders.

From the absence of epilepsy among the New Zealanders, we may infer that the proper treatment for that malady is to be found in the use of a vegetable diet, without any stimulants; ease of mind, approaching to indolence; migration to a country where the temperature of the climate is about 60° Fahr., and where the moisture suspended in the air is considerable. At London, the average fall of the wet bulb of a thermometer by evaporation is five and a half degrees; at Auckland, New Zealand, it is four and three-tenth degrees; in other words, the air of New Zealand is more moist than England.

The remarkable exemption which we have seen the New Zealanders enjoy from this dangerous and painful class of diseases of the brain is well worthy of attention, and the practical conclusion to be drawn from it is, that many of the attacks which occur in Great Britain, result from eating and drinking too much, and in allowing the passions of our nature to rise above our judgment. It may be said that the Polynesian race are little liable to disease of the brain, but this is not the case; for among the Malays in Ceylon—a similar race to the New Zealanders—apoplexy, epilepsy, mania, paralysis, and delirium tremens are all to be seen; but it is necessary to bear in mind that the Malays in Ceylon, if they do not drink alcohol, stupefy themselves with opium.

Dropsies.—This class of diseases are almost unknown among the New Zealanders. There were two cases of dropsy treated out of 2580 cases of disease, and the patients, both of whom, I believe, are still alive, were put down as labouring under ovarian dropsy, and water in the pericardium, diseases difficult of diagnosis. Of local dropsies, I have heard of some cases of hydrocele. Beriberi, a dropsical malady common among the Malays in Ceylon, is unknown in New Zealand. Bright's disease of the kidney, as indicated by dropsy, is very rare. I have examined the urine of a good many natives, and have only found it albuminous, and of a low

specific gravity in one case. In this case, the patient was suffering under the first stage of that strange disease which I have described under the head of Lepra Gangrenosa. The low specific gravity in this case was caused by the large quantity of urine passed, in consequence of a want of action in the skin. There was no dropsy; but he was suffering under disease of the lungs.

Professor Christison* is of opinion that a scrofulous constitution tends to predispose to Bright's disease of the kidney. I am inclined to doubt this, from the exemption of the New Zealanders to the disease. Dr. Christison states, that a large proportion of the patients who suffered from disease of the kidney were habitual drunkards. Now, the exemption of the New Zealanders from dropsy and kidney disease may be chiefly attributed to their abstinence from spirituous liquors, and part may be attributed to scarlatina being as yet almost unknown among them.

Rheumatic Affections.—This obscure class of diseases is much more frequent among the New Zealanders than the English. A large proportion of the applicants for relief were suffering from local pains, the severity of which did not prevent them from following their usual occupations. The attacks were often uncertain and obscure, and a large number of the cases were chronic. Out of 31 registered, only 2 were acute, and the acute cases rarely show that intensity which similar attacks do in England. The average duration of 10 cases of rheumatism treated in the Colonial Hospital at Auckland was twenty days. The usual treatment laid down for rheumatism is found very efficacious with the natives suffering from that disease, and among them it rarely terminates in any affection of the heart. Sometimes it produces death by wearing out the strength of the constitution, and sometimes local and temporary paralysis of the extremities. Toothache is met with, and extraction of the tooth is readily admitted. A dentist in Auckland, for a shilling a tooth, could get natives to allow their healthy teeth to be extracted. Gout is unknown.

The frequency of rheumatism among the New Zealanders is to be attributed to careless exposure to the vicissitudes of the weather without suitable clothing, sleeping on damp places, and sudden transitions from hot, crowded, and badly-ventilated sleeping apartments into the open air. A large proportion of the attacks might be prevented. Europeans resident in New Zealand are more subject to slight local attacks of rheumatism than in England; but acute cases are not so frequent, nor are they so severe; affections of the heart are, however, often induced. The heart appears to have a greater tendency to become affected in Europeans than in New Zealanders suffering from rheumatism—a result which may be attributed to the use of spirits.

Venereal Diseases.—Under this head are included all the diseases affecting the organs of generation. It is a painful class of maladies to come under consideration, because their introduction is attributed to the crews of Captain Cook's ships, and of the other early navigators; and it is still more painful to draw attention to the fact, that the disease is much more prevalent among the New Zealanders of the present day than among the English. There is one agreeable feature in this dark picture—a large

* Christison on Granular Disease of the Kidneys, 1839.

number of the cases are mild. Ulcerations on the penis often occur; but a true chancre, as described by John Hunter, has not been seen by the colonial surgeons of Auckland or Wanganui. Scrofulous ulceration and loss of substance occur; gonorrhœa and discharges from the urethra are very common; neglected warts and ulcers often lead to buboes; secondary symptoms, complicated with rheumatism and scrofula, are common, and occasionally terminate fatally by exhausting the strength; but I never saw a New Zealander without a nose. No case of stricture of the urethra is recorded, but I have heard of one. Hernia humoralis after gonorrhœa is very rare.

It is my opinion, filth and neglect have much to do in producing a large number of the diseases of the genital organs among the New Zealanders, and from the comparative small number of females in the country, the promiscuous sexual intercourse which takes place between both sexes who are not married, and which system is sanctioned by custom, it is only natural there should be many cases of ulcers on the organs of generation.

Medical treatment is found very beneficial in the removal of the disease, but personal cleanliness in most of the cases I have seen is all that was required; indeed, one surgeon of long experience is of opinion that true venereal disease does not exist among the New Zealanders, from the fact of the ease with which sores are cured. I examined the medical register in the Auckland Hospital, and found, out of 51 patients suffering from sores, discharges from the genital organs, and secondary symptoms, 14 were females. and 37 were males. The average residence of the females in the hospital was seventeen days, that of the males, twenty-one. A few of the patients were inhabitants of Auckland, but many came from the interior. In none of the cases were the patients discharged from hospital with anything which could prevent them procreating their species. Ulcerations are stated to have yielded readily to cleanliness and local treatment.

Among the European soldiery in New Zealand the venereal disease is rare, and is not severe. I have only known two cases of Europeans with secondary symptoms, which could be referred to contact with natives.

In former days, previous to the establishment of the British government in New Zealand in 1840, there was a small place in the bay of islands called Kororarika. It was the resort of all the numerous whaling vessels in the Southern Ocean. They were attracted to it, not only by the cheapness and abundance of pigs and potatoes, but also by the easy virtue of the women. Here a lawless body of men, chiefly from New South Wales, were congregated, and scenes of the most depraved intemperance and of the most gross sensuality were witnessed.* The New Zealand chiefs not only traded in pigs and potatoes, but in women; they kept a regular set employed; and although very little more than ten years have elapsed since this Pandemonium on earth was shut up, I am told there is only one woman now alive who acted a conspicuous part in this licentious drama. This fatality of New Zealand prostitutes is opposed to my own observation. In the town of Auckland there are about thirty

* Report of the Select Committee of the House of Lords, appointed to inquire into the Present State of New Zealand. Printed August, 1838, and laid before the House of Commons.

professed strumpets. These women generally come from the populous districts bordering the Waikato and Waipa rivers. They drink, and have all the vices peculiar to European prostitutes. They occasionally suffer from gonorrhœa, but are otherwise healthy. They rarely, however, become so demoralized as European prostitutes. They spend two or three years at this unlawful occupation, after which, either from a decay in their personal appearance, or a disgust at their mode of life, they either return to their native village, or attach themselves to one European. Whenever they do return to their own home and tribe, they are not looked on as outcasts, but are received with open arms, soon get married, and are reckoned more valuable than other women, because they have generally, even in the wretched condition of a prostitute, acquired some good habits.

The mild nature of the venereal disease may partly be ascribed to the treatment. I saw two cases of secondary symptoms, the part affected being the skin, in which the primary sores had not been treated by a European. The absence of stricture of the urethra, and hernia humoralis, where so many cases of gonorrhœa occur, is a strong proof that these diseases are often produced by high feeding and indulging in spirituous liquors.

(*To be concluded in the next number.*)

Art. II.

Observations on Calcareous Deposits in the Brain, known as Brain Sand and Amyloid Bodies. By J. T. Arlidge, A.B., M.B. Lond.

The presence of earthy matter in the human brain has been long noted, as well in the walls of its vessels as in the pineal body, in the choroid plexus, and in other parts of its substance and membranes. The collection of sabulous particles in the pineal gland has particularly arrested attention, and, owing to its almost constant occurrence, has by some been conceived a normal condition. This opinion was held by Soemmering, who proposed for the accumulation the name of "acervulus," but it certainly has no claim to a special designation. The grains of sand in the choroid being less evident, have had their presence and their peculiarities less remarked, although, I believe, they almost as frequently exist as do the pineal particles. Except in rare cases of considerable accumulations of the earthy material, the knowledge of its not uncommon presence in various other parts of the encephalon has been arrived at by the aid of the microscope.

The conversion of the larger arteries of the brain into calcareous tubes has been especially studied of late years, and its true characters and important pathological bearings been clearly determined. This subject it is not, however, my intention to handle in this paper; it has already been ably treated in the pages of this journal, in the elaborate articles on fatty degeneration,* by Dr. Handfield Jones. The present object is to describe the chemical and physical constitution of the sandy matter of the brain, and to demonstrate its corpuscular organic structure in each of its varieties.

My attention was first particularly directed to the investigation of the

* British and Foreign Medico-Chirurgical Review, for April and July, 1853.

earthy matter in the brain by meeting with a large quantity deposited in the cerebellum of a male patient, æt. 51, who died in St. Luke's Hospital, in March, 1851. The calcareous deposit existed in masses of an irregular shape, of the size of millet seeds and larger, and of a reddish-brown colour. They were found only in the great central stem of white matter, to which they gave a speckled appearance, the cerebellum in other respects looking healthy.

There were signs of old inflammatory action in the meninges;—the dura mater was inseparable from the bones, the pia mater and arachnoid were opaque, and much thickened. The larger cerebral arteries were sound; the Pacchionian bodies large, and the cranial bones very thick. The poor man suffered very distressing delusions, among which was that he should be roasted alive; he resolutely refused food, was constantly agitated, and ultimately died exhausted.

The rarity of so excessive an accumulation of earthy deposit in the cerebellum has induced me to mention the above particulars; for, although the microscope has revealed in several other instances the existence of minute granules of calcareous matter in that organ, I have never again met with it in masses visible to the naked eye.

After investigating the physical and chemical characters of this cerebellar sand, I extended my inquiries to those of the pineal grit, and of the calcareous molecules found in the choroid, and at various times sought to discover similar deposits in other parts of the brain and membranes. The results arrived at I will now endeavour to record: they are less complete than I could wish, but will, nevertheless, supply a more extended knowledge of cerebral calcareous deposits than has hitherto been published. The *localities* in which I have discovered the earthy corpuscles are:—the fibrous substance of the cerebrum and cerebellum, the pineal body, the choroid plexus, velum interpositum and pia mater generally, the cysts of the pineal and of the choroid, and exudations on the dura mater and pia mater. A more extended microscopical examination of the brain would, no doubt, have made their existence evident in other parts. Dr. Copland* has collected notices of calcareous concretions in other regions than those named—e.g., in the corpus striatum, in the corpora quadrigemina, in the union of the optic nerves, and in the pons Varolii. These cases referred to by Dr. Copland were examples of extraordinary accumulations visible to the naked eye. But intermediate between such and the mere microscopic particles are those deposits which may be detected by rubbing the brain-matter between the fingers.

Since the characters—particularly the structural—of brain-sand differ according to the locality in which it occurs, it is desirable to separately describe them in connexion with their several localities. The difference referred to, no doubt, partly depends on the nature of the tissue amid which the foreign matter is deposited.

Sand of the cerebral and cerebellar substance is alike; the fibrous nerve-tissue, the seat of its formation, being, in these two segments of the brain, similar in structure. The irregularly-shaped large masses in the cerebellum, in the case above detailed, require considerable pressure to fracture them, and, like any inorganic matter, are unchanged by exposure to the

* Medical Dictionary, vol. i. p. 224, § 121.

air and by keeping. I have some at present, after an interval of above three years, merely enclosed in a pill-box, which retains all its characters as at first. The fracture is vitreous, and the smaller fragments appear, under the microscope, very much like splinters of glass, angular, of no definite figure, transparent, highly refractive and colourless. By adjustment of the focus, however, the surface of these glass-like portions may be made to exhibit delicate wavy lines, some of which may be seen to have a concentric disposition.

By employing more gentle pressure, and adding a little water or liquor potassæ, the fragments obtained have a botryoidal outline; spheroidal corpuscles project more or less considerably, and some become completely detached. Where there is a smooth fractured surface, sections of the corpuscles are visible, along with interspersed entire ones. The latter are less hyaline or transparent than their broken portions, and present a slight yellow or orange colour. Each corpuscle seems made up of numerous concentric laminæ, surrounding a nuclear point, hilum, or umbilicus, which may be centric or excentric, but more commonly the former in this cerebellar sand. The similarity of these particles to starch-corpuscles at once suggested to me the name *amyloid* to designate them. I subsequently discovered that Purkinje, Valentin, and other German writers, had given to these and some similar bodies the name of *corpora amylacea*. Besides the concentric markings, I detected very densely radiating lines on the surface of many, very fine and indistinct. As to the chemical reaction of these corpuscles, cold acetic acid exerted little action; it, however, rendered their structure and markings more evident, and brought into view corpuscles in a compound mass previously unnoticed. Boiling acetic acid caused a rapid evolution of gas, and dissolved out the mineral salts, leaving the animal basis, which retained the outline, and the internal concentric striæ of the original globule. A much more active effervescence attended the addition of nitric and of hydrochloric acid, but the same organic matrix was left, unless, indeed, the acid was very strong, when the animal matter was itself ultimately acted upon, and reduced to a faint granular stratum.

The application of a dilute mineral acid rendered the corpuscular structure of a mass, and the markings of individual globules, more evident. Even in apparently amorphous, glass-like fragments, dilute acid will display curved and concentric lines, and so prove their organic structure. The acid solution gave a precipitate upon the addition of excess of ammonia, consisting chiefly of amorphous phosphate, with a few crystals of the triple phosphate. Upon redissolving the precipitate in acetic acid, and adding oxalate of ammonia, an abundant precipitate of oxalate of lime occurred. Hence these masses of cerebellar sand contained a small quantity of carbonate with phosphate of lime, and traces of triple phosphate, deposited in, and probably combined with, an organic material, the presence of which prevented the acetic acid acting on the carbonate. Liquor potassæ did not exert a powerful action on the corpuscles, although it rendered their concentric markings more distinct, and its use is desirable to clean portions of the grit, and to bring their composition into view. For some of these chemical details I am indebted to my friend Dr. L. Beale, to whom I furnished a portion of the calcareous matter for investigation.

Besides the evident large aggregate masses, the cerebellum contained isolated corpuscles. Such are found, pretty frequently, where no visible concretions exist, as well in the cerebrum as in the cerebellum. Occasionally two or more are united together. They are very transparent and colourless, and can be made to show, by focal adjustment, only a very slight irregularity or roughness of surface, or they may look quite structureless, and readily be mistaken for bubbles of air, and passed by unnoticed, as I expect they often are. Their true nature is, however, shown by rolling them about on the slide, observing their constancy of outline and their fracture under pressure. The addition of an acid, moreover, brings at once into view their structure, and disengages bubbles of gas, which appear to emerge through the organic envelope by pores, the bubbles tailing as they pass out. The same appearance, I may add, attends the effervescence of the clearly concentric, larger specimens, both of cerebellar and of the other varieties of calcareous deposit. On one or two occasions, I have noticed an isolated corpuscle in rolling over exhibit a disciform instead of a spheroidal figure. Some of the cerebellar corpuscles measured $\frac{1}{500}$th of an inch, whilst others were but $\frac{1}{3000}$th. All intermediate sizes occurred.

Pineal sand, like the Pacchionian bodies, is constantly found in the brains of adults, and occasionally in so large quantity as almost to occupy the whole pineal body. The deposit sometimes consists of one large calculus, the size of a split pea; at others, of several considerable pieces, or of particles of all dimensions between such large masses and an impalpable powder. As is well known, this pineal grit has a pale yellow or buff colour, and a transparent, smooth, shining appearance, at least when wet, like siliceous sand. When dry it is more dull and opaque.

This sand is more brittle than that of other parts; its fracture very sharp and short, and the fragments, which are angular and very irregular in shape and size, refract light strongly. It may be so broken down by pressure that no definite structure can be discovered by the microscope even after the addition of reagents; yet, mostly, some larger, though thin and vitreous, fragments exhibit clear, wavy, and delicate lines, which may give rise to various colours by refraction and interference of light. A piece of the sand less crushed, resembles, under the lower powers of the microscope, a mulberry urinary calculus: its surface is tuberculated, and overspread by smaller rounded or slightly angular particles. By a higher power these particles are seen to be spheroidal corpuscles, and to have their surface roughened or spotted by numerous yellowish, strongly refracting points; whilst the entire mulberry-shaped mass has a pale yellow hue by transmitted light.

The addition of caustic ammonia or potash brings out this structure more readily and distinctly. The particle of sand, wetted with a drop of liquor potassæ, should be broken down by a gentle rubbing motion and pressure on the slide. By this plan a better preparation is made, and single globules become detached.

The reaction of acids on pineal sand is essentially similar to that on the cerebellar variety, except that the effervescence produced is much more active. After the calcareous contents are dissolved out, an organic matter remains, having a rounded or ovoid form, and concentric mark-

ings, just as in the case of the cerebellar corpuscles. In the minute concretions the constituent amyloid bodies become visible, and between them a sort of connecting tissue, mostly exhibiting fine tortuous lines, like white fibrous membrane, but occasionally seeming to be structureless. By the operation of the acid, moreover, many of the apparently compound corpuscles are resolved into simple ones, of the usual amyloid form. The agency of acids on the fractured, glass-like fragments, renders the previously invisible or indistinct wavy marking appreciable, and frequently unfolds to view true concentric globules. Prolonged action, or the use of very strong acids, reduces the structures to a delicate film, or to a mere granular stratum. The amyloid bodies of pineal sand far exceed in size those obtained from the cerebellum, as well as those from other regions. Still they are found also of almost all dimensions. In figure they are less spherical than other varieties, their hilum or nucleus rarely central, and their markings generally do not form concentric circles regularly disposed, but are similarly arranged to those of potato starch, around the excentric nucleus. Again, they possess less organic material and more carbonate of lime than do amyloid bodies elsewhere derived.

Sand of the *Choroid Plexus*.—Dr. Todd,* who refers to the writings of Van Ghert, Valentin, and Bergmann for more complete details, presents the following succinct account of the calcareous concretions in the choroid plexuses:

"These internal processes of the pia mater contain minute crystalline formations, a kind of very fine sand, which, however, is not constantly present.

"The grains are deposited in the meshes of the vascular plexuses. Sometimes they accumulate in masses so as to be visible to the naked eye, or easily recognised by the touch. In general, however, they are microscopic, in form globular, and connect themselves with the minute vascular ramifications like bunches of grapes. They are found principally in the choroid plexuses of the lateral ventricles, and in that portion of the velum interpositum which embraces the pineal body. In the former they are most numerous at that part which was called by the Wenzels *glomus*, where the choroid plexus turns up from the inferior corner into the horizontal portion of the lateral ventricle."

If the earthy granules are *not* constantly present in the choroid, as Dr. Todd affirms, they nevertheless are very rarely absent, for, in my experience, I have always discovered them in some stage or other of development. Certainly, most of my observations have been made on the brains of the insane; a circumstance which, if Bergmann be right that the sand especially abounds in such, may explain the fact of my having constantly detected its presence. Still, I must add, that in each of the fewer examinations of the choroid, in individuals not insane, which I have made, the like constant existence of the amyloid corpuscles has been signalized. The cysts so frequently formed on the choroid plexuses contain among their fluid an abundance of sand, many of the particles of which are oftentimes visible to the naked eye, and form excellent objects for microscopical study. The corpuscles in these cysts are, for the most part, single; yet now and then some two or three may be found agglomerated. They vary much in size, the largest being about $\frac{1}{150}$th of an inch, while the smallest are not more than $\frac{1}{5000}$th. But whatever the

* Anatomy of the Brain and Spinal Cord, p. 29.

dimensions, their calcification always seems nearly or quite complete, and although many of them have a rim surrounding an inner globule, it is not met with in the same early fibrous condition as in the corpuscles within the meshes of the choroid.

In the plexus itself the spherical grains are best brought into view after the addition of liquor potassæ. They are seen amid the vascular network, and very often enclosed by the loops of the vessels. They present themselves in various stages of growth, are mostly solitary and spheroidal, or a few may be aggregated, or more rarely a sufficient number coalesce to constitute a mulberry-like calculus, visible to the eye and tangible to the touch. Equal, and even greater, disparity of size exists between these corpuscles in the plexus, than between those formed in the cysts. The generality of them are more or less opaque, looking yellow, orange, or even nearly black by transmitted light; they are, as a rule, spheroidal in shape; yet some are oval or ovoid, and a few club-shaped. They all appear made up of concentric laminæ regularly arranged around a central point or nucleus. The majority also exhibit a rim or border, separated from the corpuscle which it surrounds by a more or less distinct line. This rim has a fibrous appearance, the lines in it following, but rarely so regularly and completely, a circular or concentric disposition. The relative size of the border and of the enclosed corpuscle varies; still it would seem that the expansion of the former has a limit, and that the latter gradually encroaches on, and eventually replaces it, when the calcification of the entire spheroid is complete. Indeed, so long as this margin retains a fibrous character, the corpuscle may be considered incomplete, since to become entirely calcareous is its natural tendency; for the rim offers room for further growth, the nidus for further calcareous deposit. The greater amount of organic matter in the composition of the border is shown by the action of reagents,—the mineral acids do not produce effervescence in it as in the contained portion, and acetic acid causes it to swell. By it, as seen in its varying relative width, the affinity between completely earthy globules and those spheroidal masses quite fibrous throughout is established. These fibrous balls are very common in the choroid; they have a milky opacity, a rather granular appearance, indistinct concentric striæ, and do not effervesce with acids, or, at all events, not in an appreciable manner, but swell up with acetic acid. Indeed, between such completely fibrous bodies and those entirely calcareous, every intermediate stage occurs—i. e., amyloid bodies in all stages of development and growth.

In course of time, as above implied, earthy matter fills the fibrous margin, and so far assimilates it with the condition of the centre. Yet subsequently to this change, some difference would appear to subsist between the two; for, by pressure, the marginal ring may be cracked, and the central body be forced out as if it were a nucleus; and examples are not uncommon of completely calcified corpuscles having several fissures through a yet distinct rim, not in any degree penetrating the enclosed globule. On the other hand, I have met with specimens in which an unbroken circumference has enclosed a central mass so fissured as to represent two elongated corpuscles side by side, or otherwise so divided by several unequal and irregularly radiating lines as to suggest the idea of its breaking up by self-division into several segments.

Some of the amyloid bodies of the choroid have no distinct rim; such, when fissured very much, resemble aggregated masses. Another variety appears as clear, translucent, earthy globules, indistinctly laminated, and without evident dark centres.

The amyloid bodies of the choroid plexuses have more regularly-disposed and evident circular markings, a more distinct centre or nucleus, are more spheroidal, less brittle and vitreous, and have a deeper colour and less transparency, than those of the pineal body. The more globular form may probably be, in a great measure, attributed to their place of development being the loose fibro-vascular plexus, wherein their growth is uninterrupted by pressure. The last-named circumstance will also afford an explanation of the comparative infrequency of coalescence.

The chemical reaction of sand from the choroid is much the same as that from other parts, but more closely resembles the cerebellar than the pineal variety, in the less active effervescence caused by acids. Nitric acts more energetically than hydrochloric acid; yet whichever acid be employed the corpuscles swell—but only or chiefly in the surrounding rim; the colour is discharged, and they become clear and transparent; the concentric markings acquire greater distinctness, and a small clear space, devoid of circular striæ and apparently granular, frequently displays itself in the centre as a nucleus. When the dissolution of the amyloid bodies is more complete, the central portion continues still distinguishable from the surrounding margin in the more hyaline membrane left.

Of calcareous sand in other parts of the cranial contents no special description is necessary, as it resembles in all essential points the varieties already described, but more closely the cerebellar and choroid forms. Its deposition is more common in the velum interpositum than in other portions of the pia mater. However, the detection of amyloid corpuscles in simple lymph exudation is sufficiently remarkable to justify an account of the circumstances under which it occurred being here introduced.

It was in the case of a young woman, who died, in 1851, with chorea. The actual cause of death was the inability to swallow food, owing to its passage through the fauces producing severe spasms or convulsions. It was likewise a remarkable fact that this patient's mother and grandmother had both suffered from chorea.

I am indebted to my friend Dr. N. Parker for the portion of brain, and for much valuable assistance in investigating the subject of the present communication. The following account of the examination of the brain is extracted from notes made at the time.

The consistence of the cerebral substance natural; the grey lamina shallow and pale. The inner surface of the dura mater, over one hemisphere, exhibits a superficial gelatinous and reddish-yellow effusion, from 2 to 3 inches in diameter. On the surface of the hemisphere opposite is a similar effusion, occupying the meshes of the pia mater, and of a remarkably deep yellow colour. This effusion especially penetrates one of the sulci, and the nerve matter in contact with it is softened and broken up, and the *débris* mixed with it. The pineal body contains the usual calculous matter: the choroid presents some minute cysts containing sand within them.

A microscopical examination showed that the red gelatinous effusion

on the dura mater held many amyloid bodies, both single and aggregated. The bile-coloured exudation in the pia mater contained them in much greater quantity, and many of the aggregated corpuscles formed considerable concretions. Amyloid particles were also found in the cerebellum.

Together with calcareous corpuscles, the effusion exhibited rhombic, hæmatin crystals, of a deep orange colour, unalterable by acetic and nitric acids. The effused matter was converted into a corrugated, membranous, brown mass by nitric acid.

The *chemical composition* of brain-sand may be gathered from the account of the reaction of each variety previously given. Phosphate and carbonate of lime constitute the chief portion; but a small quantity of the triple phosphate of ammonia and magnesia, and, according to Van Ghert, a trace of carbonate of potash, also enter into the composition of amyloid corpuscles. Both Valentin* and Kölliker† represent the carbonate as more abundant than the phosphate of lime; but this, at least, does not seem to be the case with the cerebellar sand. In the pineal the statement is more probable, since effervescence is so very active in that variety. Valentin (op. cit.) states that brain-sand exposed to the action of fire blackens, and is with difficulty reduced to an ash even under the blow-pipe.

The organic basis or matrix of the corpuscles is nitrogenous, and apparently albuminous in composition. As noted in the remarks on cerebellar grit, the relation of the animal with the inorganic material may be of the nature of chemical combination.

The action of the various chemical reagents shows that the growth of the sabulous particles is exogenous, that new laminæ are successively deposited on the outside, and that calcification proceeds from within outwards. The choroid corpuscles illustrate this point best.

On testing the fluid of choroid and pineal cysts enclosing sand, I found nitric acid produce numerous fine, prismatic crystals, clustering in a stellate manner. Hydrochloric acid developed none. Sulphate of magnesia with liquor ammoniæ, and also the latter by itself, threw down the characteristic crystals of triple phosphate both from cystic fluid and from water in which pineal sand had been placed under the microscope.

The recent announcement by Virchow ‡ of the presence of a substance occurring in the form of starch grains, and having the reaction of cellulose with iodine, and the still later researches of H. Meckel § on cholesterin, have induced me to examine the starch-like corpuscles of the choroid with reference to the questions of composition thereby raised. I have selected the choroid corpuscles for this investigation because they are obtainable in all stages of development. I have tested both for starch or cellulose and for cholesterin the amyloid bodies equally in their earliest fibrous stage, and in the organic matrix of their later existence, the calcareous matter having first been dissolved out by acids, but have failed to meet with either of those substances. In all cases the animal basis of

* Wagner's Handwörterbuch der Physiologie, Art. Gewebe, pp. 639, 640.

† Mikroscopische Anatomie, Band ii. pp. 501, 502.

‡ Archiv für Pathologische Anatomie und Physiologie, Band vi. Heft 1—3. See, also, Journal of Microscopical Science, No. vi. p. 101, containing additional observations and notes, by Mr. Busk.

§ Annalen des Berliner Charité Krankenhauses, Jahr. iv. Heft 2.

brain-sand has stained of a yellow, orange, or reddish brown colour. The same result has attended the application of iodine to some concentric corpuscles obtained from the walls of the lateral ventricles,—the locality in which cellulose granules are stated to be especially found. I have employed the simple aqueous solution of iodine, as recommended by Virchow; an aqueous solution strengthened by the addition of iodide of potassium, and the ordinary tincture of iodine. In some experiments I have also used both iodine and sulphuric acid, dilute and concentrated.

Nevertheless I do not consider my observations at present sufficiently extensive and precise to pronounce definitively on the question, or to demonstrate the presence or absence of chemical affinities between the calcareous corpuscles I have undertaken to describe and those nearly structurally similar "corpora amylacea" revealed by Virchow; or, lastly, those particles stated by Meckel to be cholesterin in nature.

Of the *origin* of calcareous sand in the cranial contents no satisfactory account can be offered. The circumstance of similarity of form is some argument for that of origin; and yet the very different conditions, as to tissue, connexions, &c. under which brain-sand occurs, negatives the notion of a common origin of all the varieties.

It may be advanced as a general fact, that in all forms of brain-sand, the calcareous substance is deposited in a pre-existing fibrinous plasma. Such, indeed, holds true of earthy deposits in other parts of the body besides the head—i. e., calcification is a secondary phenomenon; but in them the change appears, according to Dr. Handfield Jones' valuable researches,* mostly or always associated with fatty degeneration, which is not the case with the amyloid brain-corpuscles, at least, so far as I have been able to make out. Dr. Jones, indeed, has mentioned an example of a choroid plexus, where "numerous whitish concretions of oval shape, situated beneath the epithelium, appeared as vesicles, with a distinct envelop enclosing oily contents. One such concretion, of the size of a small seed, consisted of perfectly normal fat-cells," whilst each epithelial cell "contained a distinct drop of reddish-yellow, oily-looking matter, of larger size in some than in others. Many such drops were seen floating free, as well as some colourless ones." He further records the examination of—

"A portion of one hemisphere of perfectly healthy appearance, from the brain of a man who died with hæmorrhage into the pons Varolii, and a cyst in one hemisphere. All the minute vessels just pre-capillary were coated over with a deposit of orange-yellow refracting corpuscles. These were very similar to those commonly met with in the spleen, sometimes occurring singly, but for the most part in groups. They were little affected by liquor potassæ or acetic acid, and were mingled with a few colourless oily granules. They were situated chiefly in the areolar sheath of the vessels, and did not encroach upon the inner coats; the circular fibrous tissue in particular was unaltered. The smallest vessels were much less affected, but they and the capillaries sometimes appeared less purely homogeneous than is natural, as if dotted over with granules. There was slight atheromatous deposit in the basilar artery."

Now although these descriptions do not justify the inference that the "concretions" and "corpuscles" were actually akin to amyloid bodies, yet

* See British and Foreign Medico-Chirurgical Review, for April and July, 1853, Art., On Fatty Degeneration.

the similarity in position, in form, and in relation to vessels, is suggestive of an analogy between the two. However, I do not think it can be contended that a fatty degeneration of a fibrinous plasma necessarily precedes a calcareous deposition: each change may surely be primary and final. It could be wished, particularly with reference to the "orange-yellow refracting corpuscles," that Dr. Jones had tried the action of acids upon them, for, as he says, in a subsequent paragraph,* "not only calcareous granules, but calcareous amorphous matter, may simulate the aspect of oil."

It is a curious question, to which no solution at present offers itself, why calcareous matter should so invariably form in the pineal body, for it surely is no integral, normal constituent of it. Its frequent presence in the choroid plexuses, and in the pia mater generally, may hold some relation to their vascular nature. Indeed, I have thought to detect a special relation between the amyloid corpuscles and the small arteries.

In notes, made at the time (1851), on the microscopical appearances of the large accumulations in the cerebellum, in the case above narrated, I have written, that,—

"Besides being aggregated in more or less considerable masses, the amyloid corpuscles also existed free as microscopic objects, and in this condition seemed to stand in some particular relation to the small arteries, many of which were transformed into earthy cylinders, and were apparently impervious to blood, whilst the large vessels of the brain showed no sign of atheromatous deposit."

Moreover, I have noted, relative to the second case quoted in this paper, that, "in the choroid plexus many isolated amyloid corpuscles were seen in apparently a peculiar relation to the vessels." Among the arteries, about one or two removes from capillaries, many were seen containing red or orange blood, distended and frequently varicose, constricted at short and nearly equal distances. This condition was also met with where the vessels formed loops.

"Besides these distinct and red-coloured vessels, were other tubes, exactly resembling them in form, in curvature, and in dimensions, but perfectly colourless, or nearly so, and looking like earthy canals or cylinders. Like the true vessels, they, moreover, displayed constrictions, as if jointed at nearly equal distances: in some examples, the constrictions were so deep as to nearly sever the canal. In the vicinity of these jointed tubes, were perfect and distinct amyloid corpuscles, mostly single, and, what was of especial interest, some of these corpuscles seemed attached to the calcareous branching tubes, and, in some specimens, were partly surrounded by, terminating one-half of a loop of a partially altered vessel.

"At one spot of the fragment examined were two corpuscles, in apparently different degrees of development;—the one, refracting light less than completely earthy particles, exhibited a series of concentric laminæ around a reddish nucleus, which looked exactly like a detached constricted portion of a vessel; the other, in close proximity, with decided refracting power, appeared a more advanced calcareous corpuscle."

In an extract from Dr. Todd's work on the brain, previously given, it is stated that the microscopic globular particles "connect themselves with the minute vascular ramifications like bunches of grapes;" and Dr. Hooper† has described earthy particles attached to a filamentous vessel.

* Op. cit. p. 358. † Morbid Anatomy of the Brain.

I would here also recal the particulars of the second of the two microscopic examinations quoted from Dr. Jones.

This association of calcareous amyloid bodies with calcified minute arteries may be accidental; or, as is allowable to surmise, the calcareous transformation of the corpuscles—to which they always tend—may determine the like process in the contiguous vessels. However this may be, we may assume that the organic basis of the amyloid corpuscles is derived from plastic exudation of the arteries in the areolar or connective tissue around them; that this exudation assumes a rounded, corpuscular character, from the loose nature of the medium surrounding it, that it has an exogenous growth in the superposition of successive laminæ, and that it presents a singular tendency to calcareous transformation.

In my two recorded cases, the minute vessels were alone found calcified; in the one case this happened with the cerebellar, in the other with the choroid vessels. Among the latter, I find this change not uncommon; it is accompanied by an enlargement of the tube, and often by a varicose appearance. The calcification of the minute bloodvessels has been well described, and its important pathological bearings illustrated by Mr. Paget.* According to this eminent observer, the calcification is essentially associated with fatty degeneration; and this opinion is ably supported by Dr. Handfield Jones.† But in whatever manner it originates, this state of the vessels must everywhere dispose to rupture and hæmorrhage; and it therefore results, as a natural deduction, that some effusions of blood into the lateral ventricles may take place from diseased vessels of the choroid plexus,—in other words, apoplexy may thence arise.

Among the varieties of cerebral sand, Kölliker describes‡ "rounded, stalactitic, or club-shaped, angular masses, with an uneven surface, and . . . . . simple, or branched, or reticulated, cylindrical rigid fibres;" and afterwards adds, "it is quite certain that this cerebral sand, when it occurs in the form of long, branched, reticular masses, is developed simply in the bundles of connecting tissue." On the other hand, Rokitansky speaks of the brain appearing as if filled with stiff wires, which are actually calcified small arteries, and in this view he has the support of others. It is certain that the lesser cerebral arteries do calcify, and form rigid, cylindrical, branching fibres, and between such and the stalactitic and club-shaped masses, with an uneven surface, every variety occurs; and in each the vascular nature is demonstrated by the continuation of the calcareous mass with the sound arterial tubes. Still the statement of Kölliker may be correct with respect to some branching earthy fibres; but it is questionable whether any such filiform productions should be classed with cerebral sand, which they resemble in nothing but their calcareous composition.

The production of cysts on the surface of the choroid plexuses is not uncommon; such are of a rounded figure, with elastic fibrous walls, collapsing, when punctured, with force enough to spirt out their fluid contents. In one case, I met with a delicate tesselated epithelium apparently lining the sac. Less commonly a cyst grows from the pineal gland, and sometimes more than equals that body in size. How these cysts

* See the Report of the Pathological Society for 1851-52.

† Op. cit. pp. 341, 342.

‡ Mikroscopische Anatomie, Band ii. p. 502.

originate I am not prepared to state. I here mention them only with reference to their sabulous amyloid particles, which exhibit no organic relation to vessels, and none even to exudation matter, as they float isolated within the cavity of the cyst, or lie loosely on its walls. The only explanation that occurs to me, rests on the chemical composition of the circumambient fluid, which, as elsewhere stated, is similar to that of the corpuscles;—it is, that these sandy particles are formed by accretion of molecules from the fluid, just as in the case of calculi in the bladder.

The following quotation from Dr. H. Jones* may throw some light on the appearance of amyloid corpuscles in the products of inflammation, as recorded in a previous page:

> "Extravasated *blood* which is undergoing absorption, is described by Rokitansky as exhibiting, besides various quantities of yellowish, red, or brown pigment, free fatty matters of different kinds, in the form of small, dark, outlined, separate, or coalescing molecules, of great clear drops, of cholesterin crystals, together with the finest dust-like substance of albuminous, oily, or earthy nature."

The substance last named may furnish the rudiments for the building up of the future calcareous concretion in the fibrinous plasma, which, from some unknown formative power, assumes a corpuscular form. Kölliker writes,† "In other cases, it (cerebral sand—the form?) appears to be a spontaneous incrustation of fibrinous coagula." This notion implies that of the calcification advancing from periphery to centre, and is opposed by the observations recorded in this paper. In the second case, as above described, the amyloid bodies in the gelatinous effusion on the dura mater were the most difficult to account for. Those in the detritus of brain-substance, in the exuded matter on the surface of the hemisphere, and in the meshes of the pia mater, may naturally be conceived to have originated prior to the disease causing the effusion and softening.

Before quitting the subject of the *genesis* of cerebral sand, I must not omit to notice an observation recorded by Mr. Busk,‡ which, if confirmed, and the deduction derived from it be admitted, will invest the origin and nature of calcareous corpuscles with new interest. That distinguished microscopist writes, that, in the corpora striata of the first brain he examined for cellulose, he "could find few or no starch-grains, but here an appearance presented itself which seems to be connected with their formation. Many particles of sabulous matter or crystalline corpuscles of the ordinary 'brain-sand' were met with, all of which, instead of lying like the starch-grains, in the midst of unaltered nerve-substance, were lodged in irregular masses of what appeared a fibrinous or immature connective tissue-substance; and, in this instance, upon the addition of iodine, each mass of crystals was found to be immediately surrounded by an irregular thickness of a transparent matter, which was turned not *blue*, but a light purplish-pink, by that reagent—a substance, in fact, closely resembling in that respect the very early condition of the cellulose wall; for instance, in *Hydrodictyon*,—an immature form, as it may be termed, of cellulose." In a second case examined by Dr. Busk, he "did not notice the *quasi* cellulose-deposit around the particles of 'brain-sand.'"

* Op. cit. p. 354. † Op. cit.
‡ Journal of Microscopical Science, 1854, p. 107.

In seeking out the affinities of cerebral sand, I examined earthy deposit in other parts besides those named (p. 471),—as, for instance, in the calcified coats of arteries, in the calcareous matter of the interior of an old goître, and in that of altered tubercle, but in none did I find it combined with animal tissue, forming laminated concentric corpuscles. The situation of the Pacchionian bodies within the cranium, and their fibrous nature, led me to examine them, but I failed to find any structures resembling the amyloid grains described. However, Mr. Busk states,* that he not only met with true corpora amylacea (Virchow) in much-developed Pacchionian granulations, but also "other concentrically-laminated bodies, which formed botryoidal masses imbedded in a stroma of immature connective-tissue: these bodies, which might, to distinguish them, be termed 'chalcedonic corpuscles,' were rendered yellow by iodine."

The industry chiefly of German microscopists has brought to light the existence of laminated, concentric corpuscles in many tissues, and even in several secretions of the body. In the case of many of them, it has been endeavoured to establish an identity with the corpora amylacea—the cellulose grains of Virchow; but, probably, the affinity of the majority of them is with the laminated particles of brain-sand. This affinity is indicated in several among them, not only by similarity in physical conformation—which is, indeed, *per se*, inadequate to do so—but moreover by their calcareous composition. Among such intimately allied bodies are the spherical grains in the urine of the horse, originating principally in the prostate gland, and which, like the calcareous corpuscles of the brain, have concentric markings, a more or less defined nuclear space, but, unlike those, present also radiating striæ, and fracture in a more radiating manner. These prostatic concretions are well described, and their origin traced by Virchow, in a communication to the Würzburg Academy,† to which I would refer also for an excellent summary of the many varieties of amyloid corpuscles.

It does not seem at present desirable to extend the consideration of the affinities of the brain-sand corpuscles, and particularly as it is to some extent entered upon in the analytical review of the cellulose question, contained in the present number.

Art. III.

Historic Data, &c., in reference to some points of Infantile Pathology. By W. Hughes Willshire, M.D. Edinburgh, Physician to the Royal Infirmary for Children, &c.

(*Continued from No. 24, p. 529.*)

No. II.—*Scrofulous Meningitis. Syn. Granular, Tubercular Meningitis, Acute Hydrocephalus; Whytt's Disease; Dropsy in the Brain; Water on the Head, &c.*

Whether the ancients were familiar with that affection which, in modern times, has so generally been denominated "acute hydrocephalus," is a

* Journal of Microscopical Science, No. 6, 1854, p. 107.

† Ueber dem Bau und Zusammensetzung der Corpora Amylacea des Menschen (Verhandl. der Physikalisch-Medicin Gesellschaft in Würzburg, Zweiter Band. 1852, p. 51); and Medico-Chirurgical Review, vol. xi. 1853, p. 547.

point difficult to determine. Dr. Joy* affirms that Hippocrates "was certainly acquainted with it—clearly characterizing some of the most characteristic features of the disease;" and Dr. Copland remarks,† that he notices an affection "which has a marked resemblance to the symptoms of the acute or subacute form of this disease, and, at the same time, assigns water on the brain as its cause;" but that acute hydrocephalus, "notwithstanding the remark of Hippocrates already referred to, was formerly confounded with cerebral fever, or fever with determination to the brain." Nearly a century ago, thus wrote Dr. Whytt:‡ "Hippocrates, in his second book, 'De Morbis,' has enumerated the signs of water on the brain, as his words have been rendered by all the translators. But *επι τω εγκεφαλω* more properly signifies *upon* than in or within the brain; and that Hippocrates speaks here of water lodged between the dura mater and the cranium can scarcely be doubted, since he proposes to evacuate it by making a perforation into the upper part of the cranium, *προς τον εγκεφαλον*, which operation could have been of no use, had the water been contained within the brain itself." (p. 726.) Akermann is of much the same opinion as Whytt, but Gölis thinks differently, considering that Hippocrates does allude to acute hydrocephalus. Laennec and Frank coincide with Gölis, whilst M. Littré, whose labours in connexion with the Hippocratic treatises attach importance to his opinion, thinks that though acute affections of the brain are referred to in these treatises, yet it is impossible to distinguish the acute hydrocephalus of children. Dr. Adams,§ in his analysis of the books *περι νουσων*, (by some ascribed to Hippocrates, and by others to some member of the school of Cnidos,) remarks, "Eight diseases of the head are described, but in such terms that we fail to recognise the distinguishing features of each. Besides these, a little way further on, the author describes several other diseases of the head, including hydrocephalus, the symptoms of which are given with great precision—namely, acute pain about the bregma and temples, alternate rigour and fever, impairment of the sight, double vision, vertigo, &c. He recommends errhines, purgatives, and even trepanning of the skull. Even of this disease several varieties are described in striking terms." After reference to the passages *sub judice*, we confess ourselves unable to arrive at a determinate judgment upon the point at issue; for whilst, on the one hand, the *οδυνη οξεια ισχει δια του βρεγματος*, &c., incline to the one opinion, the advice, *επειτα ανακυμισας σιτιουσιν*,‖ before puncturing the head, inclines us to the other; for surely it would be impossible for the patient to take any food to recover or support him in the state he must be in immediately preceding the attempt at puncturation. We must assume stupor or coma to be present, as indicative of the necessity for this operation, the case not having been benefited by the treatment already adopted, but having proceeded from bad to worse. The only way that occurs to us of attempting to reconcile the discordancy, is by rather the far-fetched one of assuming that the ancient writer (whoever he was) was

* Cyclopædia of Practical Medicine, vol. ii. p 452.

† Dictionary of Practical Medicine, vol. i. p. 660.

‡ Observations on the Dropsy in the Brain, never before published, p. 725, contained in the quarto edition, published by his son. Edinburgh, 1768.

§ Hippocrates (Sydenham Society's edition), vol. i. pp. 91, 92.

‖ Hippocrates, Edit. Kühn, vol. ii. Leipzig, 1826.

acquainted with that peculiar and deceptive remission of symptoms which sometimes occurs in acute hydrocephalus, and which has been termed "the lightning before death."* Of this we have seen two or three very marked examples, the patient suddenly emerging from his state of danger, becomes conscious, recognises his parents, and may even be got to swallow food; but which remarkable change is soon followed by another, the harbinger of death.

According to Dr. Copland,† "from Hippocrates to Rhazes, no mention is made of internal hydrocephalus. But this latter writer states in his book on the diseases of children, that the head sometimes acquires an increased bulk, owing to the collection of fluid within the cranium," whilst Ettmuller‡ remarks, that Andreas Vesalius was the first who alluded distinctly to effusion into the ventricles, though Hieronymus Mercurialis, who flourished at the beginning of the sixteenth century, hints that the collection of water in the ventricles is a thing that may possibly occur, but adds, that apoplexy must necessarily follow. In Dr. F. Adam's learned commentary upon Paulus Ægineta,§ further references may be found to the older writers. We must at present content ourselves in respect to this point with the following extract from the work of Fabricius,|| premising that it is very certain that up to the eighteenth century, the common term of *hydrocephalus* was used in a very vague and general sense, and that internal and external hydrocephalus, cephalhæmatoma, caput succedaneum, simple acute meningitis, cerebral congestion, either primitive or secondary, &c., were constantly included under one and the same denomination. "It appears (says Fabricius) that Galen intimates that hydrocephalus is a particular disease of certain parts of the head, and not a dropsy of the whole head. Aëtius confirms it, and Paulus, in laying down the varieties of hydrocephalus, says, that there are four—one in which the fluid settles between the brain and its involucrum; another, in which it occurs between the membranes and the bones; a third, in which it is between the bone and pericranium; and a fourth, in which the fluid is between the bone and the integuments, all of which varieties constitute general dropsy of the head, and indicate also the particular parts of the latter which are affected. The same varieties of hydrocephalus are given by Aëtius also, but with the addition of another—viz., in which the fluid is collected *in musculis temporum.* The causes of hydrocephalus are some external and some internal. Amongst the former, Paulus alludes to a new-born child, whose head was pressed by an unskilful obstetrician. Another cause is contusion, or a blow [collisio], or a rupture of one or more vessels, likewise indicated by Paulus. A third is the cold atmosphere to which the child's head may have been for some time exposed. A fourth is the drinking of too much water or wine by the pregnant woman during gestation, or by the nurse whilst suckling. Also laxity of the vessels or openings, a relaxation of the local vessels (as Aëtius says, loc. cit.), by which matters exhale and collect." Fabricius himself then goes on to say, that he determines two chief forms of hydro-

* Elliotson, in Lancet, 1832, vol. i. p. 325.
† Op. cit. p. 660. ‡ Opera om., tom. i pp. 446, 447.
§ The Seven Books of (Sydenham Society's edition), vol. ii. p. 251.
|| Hieron. Fabricius ab Aqua pendente Opera Chirurg., p. 407. Lugd. Batav., 1723.

cephalus, the first including the various kinds dependent upon "serous humidity," as laid down by the old writers just alluded to, and whose cause is internal; the second, embracing those varieties "not containing pure serum, but feculent blood mixed with it, which has issued from a vein ruptured by contusion, and the cause of which is external."* Now, in this classification of Fabricius, we see the complete separation made between the true serous or hydrocephalic effusions, and the class of cases indicated in modern times by the terms of cephalhæmatoma and caput succedaneum. It is true that he still talks of "hydrocephalus from the rupture of vessels" (p. 413); yet that he was aware of the true nature of this class of cases is clear, as also that he recommended a treatment identical with that advised by some even at the present day. He says, "if the abscess has arisen from contusion and rupture of the vessels, and in which not only watery humidity, but also feculent blood is contained, the intention is to discuss and evacuate it, which is effected by stupes, &c." (p. 414.) The first distinct treatise that we know of, calling especial attention to cephalic tumours of this character arising during birth, and completely separating them from hydrocephalus, is the one of Heins,† published in 1743, a subject afterwards more fully treated of by Michaelis in 1799,‡ by Klein, Zeller, Nägelle, &c., and which, in later years, has been so fully investigated by Valleix and others. With regard to the distinct recognition of the acute hydrocephalus of modern times, and its discrimination from other forms of "serous or watery humidity of the brain," the first record of its having been made, and which we have been able to refer to, is the paper of Petit, published in 1718.§ In his remarks on "hydrocephalon," the writer states that there is a *third* variety of the disease, "in which there is an excessive augmentation of the fluid naturally in the ventricles of the brain;" and further, "that this is the only form that I have met with in the practice of surgery, or in the examination of bodies, so that I am led to believe the other species are very rare." Petit's *first* variety of this ventricular dropsy is plainly nothing but congenital hydrocephalus; but his *second* is undoubtedly "acute hydrocephalus," as it supervenes "in the course of difficult dentition, the verminous affections and strong convulsions which afflict children." The connexion of the disorder with scrofula is even pointed out, as it is said that "the malady happens likewise to such children as have some vice of the lymph, or obstruction to the conglobate glands."‖ In concluding his paper, Petit admits that his observations are insufficient to warrant him in hazarding a theory of the pathogeny of the disease.

In 1733¶ Andrew St. Clair, professor of medicine in Edinburgh, described "The Histories of a Fever and of an Epilepsy," the latter case appearing to have been one of acute hydrocephalus in a child of four years of age, whose lungs (be it remembered for future consideration) "were full of tubercles . . . the bloodvessels of the brain were all greatly

* Op. cit., p. 409.

† Dissert. de Capitonibus partu laborioso nascentibus. Lips., 1743.

‡ Loder's Journal für Chirurg. Gebürtshülfe, &c., Band ii. Jena, 1799.

§ Mémoires de l'Académie Royale des Sciences. Paris, 1718.

‖ Op. cit. p. 98.

¶ Medical Essays and Observations, by a Society in Edinburgh. We quote from the second edition, corrected, vol. ii. p. 298. Edinburgh, 1737

distended with blood, and in the ventricles about six ounces of water were found."* About the same time also an account was given† of "A hydrocephalum with remarkable symptoms, by Mr. John Paisley, surgeon in Glasgow," a perusal of which, however, only entitles us to say that we believe the author was acquainted with acute hydrocephalus. M. Rilliet, quoting from Bricheteau (whose work unfortunately we have not been able to refer to), alludes to a M. Duverney as having made the first distinct reference to this affection as early as 1701. Whatever uncertainty may exist as to how early acute hydrocephalus had been recognised, most writers allow that Robert Whytt, in 1768,‡ was the first to lay down the correct symptomatology of the affection. So well was this done, too, that MM. Rilliet and Barthez remark, "that we cannot too strongly admire the descriptive talent and great power of observation evident in each page of this interesting monograph." As regards the pathology of the malady, however, Whytt does not merit such praise, though for many years his vague and erroneous views completely guided a great school of pathology in reasoning upon the nature and causes of the affection. Whytt assigned as its immediate cause "such a state of the parts as makes the exhalant arteries throw out a greater quantity of fluid than the absorbent veins can take up," (p. 735.) such immediate cause being produced by "a laxity or weakness in the brain, whereby the small exhalant arteries of the ventricles will throw out the lymph faster than the absorbent veins can imbibe it," by compression of the skull at birth, the pressure of a tumour on the neighbouring trunks of the absorbent veins, from too thin and watery a state of the blood, and from "a suppression of urine," the result of some chronic affection. In the same year that Whytt's observations appeared, some "remarks," &c., were published by Dr. Fothergill, chiefly to show that the disorder arose from the rupture of a lymphatic vessel in the brain, and that its cure was to be deemed as scarcely within the compass of our art. From the time of Whytt (1768) to that of Quin in 1779-80, most writers regarded the ventricular effusion or dropsy as the essential element of the disorder, however much they differed as to the cause of the former. It was, in fact, considered to be the lesion giving rise to the various symptoms characterising acute hydrocephalus. Quin, however,§ endeavoured to demonstrate that the dropsy was not the essential phenomenon, but that the disease had its origin in a morbid accumulation of blood in the vessels of the brain, sometimes rising to a certain degree of inflammatory action, and which *often* produced; but *not always*, an effusion of fluid before death. Dr. Edward Ford adopted in part the idea of Quin, whilst, in 1785, Cullen,‖ in drawing the distinction between the acute and chronic forms, maintained the former to be an apoplexy—apoplexia hydrocephalica—because "it is never evident to the senses, because its symptoms differ very much from hydrocephalus, which is evident; and, finally, since its proximate cause as well as symptoms approach so very much those of apoplexy." It has been stated¶ that Cullen here had in view that form of the disorder afterwards denomi-

* Op. cit., p. 298. † Medical Essays, &c., same edition, 1737, vol. iii. p. 335.
‡ Op. cit. § Dissert. de Hydrocephalo interno. Edinburgh, 1779.
‖ Synopsis Nosologiæ Methodicæ, &c. Edinburgh, 1785. Ed. Thompson, 1827.
¶ The Diseases of Children. By F. Churchill, M.D., &c. Dublin, 1850.

nated by Goelis and the Germans *wasser-schlag*, or *water-stroke*. But this opinion we cannot coincide in, seeing that Cullen's words, "paulatim adoriens," &c., forbid it. In 1789 Dr. Rush,* though believing that the effusion of fluid was the consequence of a preceding inflammation, showed that death might occur, and not more than a teaspoonful of fluid be found in the ventricles. Dr. Percival† "was among the first who appears to have been aware of the fact that, however nearly acute hydrocephalus may approach true inflammation, it is no more identical with it than the adhesive form of inflammation is the same as the diffused, or as erysipelas;" besides this, "he demonstrated its frequent connexion with scrofula" (Copland). It is unnecessary to refer to any other writers of the eighteenth century, or of the commencement of the nineteenth previous to Dr. Cheyne, with the exception perhaps of Dr. Garnet. This author, in 1801,‡ maintained "that the disease depends upon, and is accompanied by, a plethoric state of the vessels of the brain, occasioning a considerable degree of inflammation, and generally, though not always, producing an extravasation of fluid before death; and he seems to think that the symptoms which usually show themselves in this disease do not depend upon the effused fluid, which he conceived to be the consequence of the disease rather than the cause of it. In so far he has acquiesced in the views of Quin" (Cheyne). In 1808 appeared the first edition of a work which has deservedly held a high character, and in which nevertheless the pathogeny of the affection of which it treats appears to us to be but vaguely and unsatisfactorily determined. We allude to the work of Dr. Cheyne,§ who, in his second edition (1819), thus writes: "Although I refer most of the symptoms of the disease to the morbid state of the circulation in the brain, I am equally far from thinking, with Dr. Rush, that this action resembles that which takes place in phrenitis." (p. 29.) "In its first stage hydrocephalus is evidently attended with a considerably increased arterial action; . . . . this disease differs essentially from fever, apoplexy, or phrenitis; . . . . several diseases seem to produce a disposition to hydrocephalus, but in so far as we know, scrofula alone is liable to mutual conversion with hydrocephalus; . . . . to conclude, hydrocephalus appears to consist in a diseased action of a particular kind, but of what kind we can as little explain as we can the nature of the scrofulous or the syphilitic action." (p. 34.) Between the publication of the first and second edition of Dr. Cheyne's treatise, a work appeared in Germany which soon acquired considerable reputation,|| and which, as regards its account of the symptoms and differential diagnosis of acute hydrocephalus, well deserved it. In it Gölis affirmed "acute ventricular dropsy" to be "always the secondary disease of previous inflammatory turgescence and inflammation (encephalitis) of the meninges, or of the vessels of the brain itself (phrenicula, according to Rush, Markus, Stark,

* Medical Observations and Inquiries.

† Medical Facts and Observations. Manchester, 1791.

‡ Observations on Hydrocephalus.

§ Essay on Hydrocephalus Acutus, or Water in the Brain. Dublin, 1808. Second edition, 1819.

|| Practische Abhandlungen über die vorzüglicheren Krankheiten des Kindlichen alters. Erster Band. Von der hitzigen Gehirnhölen-Wassersucht. Von L. A. Gölis. Zweite Auflage. Wien, 1820. Erster Auflage, 1815.

Sprengel, Girtarner, Rand, Lieutaud, Henke, and Speyer);" such view of its inflammatory nature being determined by the symptoms and pathognomonic signs of encephalitis and the result of a particular therapeia. (p. 13.) *Four* stages of the disorder are described by Gölis, and its diagnosis from "worm and mucous fever," typhus fever, and internal chronic hydrocephalus, given. The form of the affection called *wasser-schlag*, or *water-stroke*, was (we believe for the first time) clearly described as a *sudden* effusion of serous, lymphatic, &c., fluid within the brain, occurring either idiopathically or as a consequence of other diseases, and inducing death in a few hours. Between the years 1818 and 1825, Abercrombie, Hall, and Gooch insisted upon the necessity of drawing the distinction between true hydrocephalus, or inflammation of the brain, and a state of exhaustion (hydrocephaloid disorder—the *apoplexia ex inanitione* of older writers, in the opinion of some), which is apt to be mistaken for it, and treated accordingly. In 1825 an able monograph was published by M. Senn, of Geneva, in which it is laid down that "the denominations of inflammation of the membranes and acute hydrocephalus designate the same affection," which is, in truth, inflammation of the meshes of the pia mater, and the most frequent termination of which is death. For, according to Senn, it is most likely that those writers who have spoken of curing a half, the fourth, or even the fifth part of their patients, have mistaken other affections for inflammation of the membranes.

From the time of Quin (1780) to that of Senn (1825) or Guersent (1827), the prevalent opinion was that the fundamental or essential lesion of acute hydrocephalus consisted in inflammation, though opinions varied as to the primary or precise seat of the latter. According to Gölis (1815) it was in the arachnoid; Piorry (1822), Parent du Chatelet, and Martinet (1825) in the arachnoid of the base; according to Coindet (1817) it was seated in the cerebral ventricles; to Brachet (1818), in the lymphatics; whilst Abercrombie placed it in the central substance of the brain itself and the lining membrane of the ventricles, and Lallemand regarded the inflammatory action as sometimes commencing in the brain and then invading the membranes, and other times as beginning in the membranes and afterwards involving the brain. By Senn (1825), as we have just seen, the meshes of the pia mater were held to be the locality. There were several exceptional opinions to the above, however, advanced between the time of Quin and Senn. Mitivie (1823) and Bricheteau (1829), though alluding to the post mortem evidences of inflammatory action, still regarded the effusion as the chief characteristic phenomenon in the malady; whilst Dr. Nicholl (1821) and Dr. Shearman (1825) again supported the views of Formey (1810) and Smith (1814); and all, though differing in some subsidiary points, viewed the effusion as a consequence of simple excitement of the cerebral circulation independent of inflammation, or as the result of a condition of erythism of the brain (Nicholl) either of a "sensitive" or "torpid" character. The latter term, "torpid erythism," being one which Dr. Bennet has remarked upon as being rather peculiar. Dr. C. Smith "has argued against inflammation, and in favour of

debility, as the cause of the effusion, but whilst he has strenuously contended for the latter pathological condition as respects the tone of the extreme vessels, he has admitted the existence of accelerated circulation, and its influence in producing the disease."* Notwithstanding these and some other exceptional opinions, we may assume that the general belief was that the essence of acute hydrocephalus consisted in inflammatory action of the meninges, and the ventricular effusion was of a secondary and less essential feature in the malady. The next important point in the history of the former to be noticed is, that whilst many writers seem to have regarded the inflammation as of the pure simple kind, or possessing no specificity of character, a few others drew attention to the not unfrequent complication of the disorder with the scrofulous diathesis, (Percival, Petit, Cheyne, &c.), St. Clair commenting, as we have seen, upon the coexistence of tubercles in the lungs. Even Willis, as long ago as 1672,† indicated the association of what he calls *tubercles* with cerebral disease—viz., "Nec minus à phlegmone et abscessu, quam ab hujus modi meningitis, nodis et tuberculis nonnunquam cephalalgiæ lethalis et incurabilis oriuntur." And Bichat, in the preliminary remarks to his 'Anatomie Générale,' observed, "that the serous tissue belongs to the brain in the form of the arachnoid, to the lungs by the pleura, to the heart by the pericardium, to the gastric viscera by the peritoneum, &c., is a matter of no consequence. Everywhere it becomes inflamed after the same manner, dropsical effusion uniformly ensuing. Everywhere it is subject to a kind of eruption of little whitish tubercles, as if miliary, of which, I believe, no mention has been made, but they nevertheless merit great consideration." Notwithstanding all this, no pathologist seems as yet to have pointed out and insisted upon the *necessity* of another element besides the inflammatory one, and by which the latter is very greatly modified in acute hydrocephalus. The first approach appears to have been made by M. Guersent.

In the year 1827, M. Guersent‡ remarked that the inflammation of the meninges constituting acute hydrocephalus presented such peculiarities as to lead him to denominate it "granular meningitis" in the registers of the hospital; but although he thus separated the meningitis of hydrocephalus from other inflammations, he did not connect the granular deposit met with in the former affection with the morbid deposit tubercle. In 1829, Charpentier§ likewise spoke of certain "granulations," but no association of them with the tuberculous element was pointed out. This was left for M. Papavôine to effect, who, in 1830,|| published two cases of "tuberculous arachnitis," in one of which effusion into the ventricles, or hydrocephalus, existed. The meningeal granulations or tubercles were described with care, and two forms indicated, viz., plates or layers, and granulations. The coincidence of the meningeal granules with tuberculous deposit elsewhere was remarked upon, as also the apparent occurrence

* Copland, op. cit., p. 670.

† De Anima Brutorum. Oxon., 1672.

‡ Dictionnaire de Médecine, &c., Art. Méningite, vol. xix. p. 387.

§ De la Nature et du Traitement de la Maladie dite Hydrocéphale-aigue (Méningo-céphalite des Enfants). Paris, 1829.

|| Journal Hebdomadaire de Médecine, p. 113. Paris, 1830.

of the former previous to the inflammatory action in the meninges, and in one case the existence of the tuberculous granules without the sequence of inflammation.

The important pathologic element of acute hydrocephalus, thus clearly pointed out by M. Papavoine, now became apparent to observers. In 1833 a most admirable paper was published by Dr. W. W. Gerhard,* illustrated by the history of 32 cases, "all of which had been regarded as examples of the affection known under the names of hydrocephalus acutus and meningitis, and which had offered on dissection a lesion of the cerebral organs or membranes. It will be seen that all the subjects, with the exception of 11 and 12, presented tubercles in other organs than the brain," and in the latter or its membranes were either granulations, yellow opaque substance, or "evidently tuberculous matter." The author, therefore, was induced to regard this form of cerebral disorder as closely analogous to the deposition of tuberculous matter in other organs. "Those who think his evidence sufficiently strong, may adopt his own conclusions without agitating the question of the inflammatory or non-inflammatory nature of the disease." (p. 105, vol. xiv. op. cit.) In 1835, MM. Fabre and Constant,† in the same year also M. Rufz.‡ and, in 1836, M. Piet,§ further developed the tuberculous character of the granular meningitis of acute hydrocephalus, and the profession in this country were somewhat surprised by the appearance of the valuable papers of Dr. Hennis Green in the 'Lancet,'|| upon the same subject—viz., "tuberculous meningitis." "If," says Dr. Green, "we have ventured to introduce the above new term in medicine, we have not done so without long reflection, and the support of an extensive series of pathological observations. We are prepared to prove that the disease commonly called acute hydrocephalus is accompanied, *in a very great majority of cases*, by an inflammation of the meninges with the deposit of the tubercular matter in the form of granulations or cheesy matter; we, therefore, prefer abandoning the term hydrocephalus, because all physicians of the present day are agreed that the effusion forms no essential part of the disease; and in adopting in its stead, at least for the form we treat of, a denomination which has the advantage of denoting the pathological change and its most striking character." A critique on Dr. Green's paper was published in the same volume of the 'Lancet' by Dr. Herbert Barker, who remarked that "there can be little doubt that the scrofulous diathesis exists in a great majority of the cases of acute hydrocephalus, yet there are several predisposing causes independent of scrofula, most, if not all of which, Dr. Copland has mentioned, and the influence of which Dr. Green, from his observations, would appear too greatly to limit." In 1837, the second edition of Charpentier's work we have before referred to made its appearance, and in which, in allusion to the "tuberculous granulations," the author observed that "these abnormal products are no doubt frequently met with in children dying of this malady, and we were, we believe, one of the first to point them out; but it is an error to consider them as

* American Journal of the Medical Sciences. Philadelphia, 1833, 34, vols. xiii., xiv.
† Mémoire inédit. sur la Méningite tuberculeuse couronné, par l'Institut. Paris, 1835.
‡ Gazette Médicale de Paris. § Thèse sur la Méningite-tuberculeuse.
|| Lancet, 1835, 36, vol. ii. p. 232.

necessary for its development. If M. Rufz has met with them in nearly all the bodies he has examined, it is simply because nearly all the children have been scrofulous. It is, however, more reasonably affirmed by him that those granulations which are more frequently found in the fissure of Sylvius, between the commissures of the optic nerves in the choroid plexus, in a word, at the base of the brain, are, when they become agglomerated, a frequent cause of the effusion in the ventricles, from the disturbance they give rise to in the venous circulation." Notwithstanding some opposition to the views first mooted by M. Papavoine, they gradually assumed a firm position, so that M. Guersent, in 1839, wrote an able and elaborate article* on "Tuberculous Meningitis," and asserted that "this species of meningitis presents constant alterations and anatomic characters very different from those of ordinary meningitis," and that he had always described, in his clinical lectures, hydrocephalic children as phthisical patients *qui mouraient par le cerveau.* Without reference to further authorities, we may consider the present epoch of the subject carried on to the year 1843, in which appeared the systematic work of MM. Rilliet and Barthez. By this time all competent observers preserving the diagnosis between caput succedaneum, cephalhæmatoma, congenital and chronic hydrocephalus, dropsy of the membranes, hydrocephaloid disorder, meningeal congestion, and inflammation of a secondary character in the course of fever, &c., and acute hydrocephalus, affirmed the latter to be connected with the scrofulous or tuberculous diathesis, to be marked by an almost specific form of inflammation of the membranes, to be denominated *granular*, the granulations being shown to be analogous to the tuberculous granulations of other serous membranes. Further, the granular meningitis of acute hydrocephalus was asserted to occur chiefly, if not alone, in subjects presenting tuberculous deposit in other organs of the body, that the effusion into the ventricles was of a non-essential or secondary character, and that it was even doubtful if there was such a thing which could be legitimately called idiopathic or essential acute hydrocephalus.

During the next epoch—from 1843 to our present time (1853)—while the more important laws just referred to have been substantiated, several other important points in the history of meningitis we shall find have been elucidated or discussed. In the first place, we are indebted to MM. Rilliet and Barthez for showing that the diagnosis applied to the meningeal affections of children had not been sufficiently exact in its character, or at any rate, that if one or two (as we shall presently show) had carried out a deeper analysis than most observers, still that this analysis had not been carried to the extent it ought, and its terms not sufficiently and clearly laid down, or almost unattended to in practice. The defect pointed out by MM. Rilliet and Barthez was the following: that no sufficient diagnosis had been drawn between granular or tuberculous meningitis, or the ordinary acute hydrocephalus and simple or non-tuberculous, non-specific inflammation of the cerebral membranes. In 1843, the authors in question drew the line strictly and rigidly between the two affections (simple and tuberculous meningitis), and

* Dictionnaire de Médecine, tom. xix. p. 393.

the following extract from the historic note appended to their chapter will illustrate the position of the question up to their own period. "We know of no monograph upon simple meningitis. Nevertheless, M. Guersent, in his article, *Meningitis*, in the 'Dictionary of Medicine,' has separated simple from tuberculous inflammation. According to him, the former is more frequent in new-born children, whilst from two to five years of age, its frequency, in comparison with the tuberculous form, is but as 2 to 12. M. Guersent says nothing special as regards the symptoms it presents in infancy, and affirms that it may pass into the state of chronic hydrocephalus. As we have already said, the isolated facts published in later years have not sufficient authenticity to enable us to decide whether some of them relate to the malady we are discussing. Exception, however, is made to the observations of M. Hache in the 'Journal Hebdomadaire,' of M. Rufz in the 'Gazette Médicale,' and to those of M. Durand in the 'Clinique des Enfants.'" The account published by Albert,* of an epidemic of (as it is termed by him) acute hydrocephalus, seems in some respects to answer to "simple meningitis;" but as the post-mortem lesions are not described, it is impossible to arrive at a satisfactory judgment upon the matter. Beside the elucidation of the above points, the question as to whether there really is such an affection as idiopathic acute dropsy of the cerebral ventricles, is, during the coming epoch, vigorously argued. In alluding to the views of MM. Rilliet and Barthez, we shall prefer seeking our illustrations from the more advanced opinions published by the former in 1846-7, requesting the reader to bear in mind, however, that it was as early as 1843 that these eminent investigators first drew attention to the subject.†

From the literature of our own country during the following period, it is unnecessary at present to do more than refer to the views of Dr. Risdon Bennett, published in 1843,‡ and of Dr. Thomas Smith, in 1845.§ According to the former, there are four varieties of the affection usually understood under the term of acute hydrocephalus. In one set of cases "the disease consists simply in inflammation of the brain and its membranes;" in another, and "by far the largest class of cases, the disease is essentially *the result of scrofulous action*, and may or may not be attended by the signs of inflammation,"—"but that meningitis, chiefly of the base, is a very frequent secondary lesion, and is usually of a manifestly strumous character." Thirdly, there are cases in which "the essence of the disease appears to consist in some alteration in the condition of the nervous matter, probably allied to irritation;" and "there is a class of cases distinct from the above, but closely allied to them, which may generally be traced to some source of exhaustion," and which include "the cases described by Dr. Hall and others, under the designation of *hydrocephaloid disease*." On the other hand, Dr. Smith, being struck with

* Hufeland's Journal der Prackt. Heilkunde, Aug., 1830.

† It is necessary to bear in mind that the second edition of the Traité Clinique et Pratique, &c., has been published since the present paper was written.

‡ The Causes, Nature, Diagnosis, and Treatment of Acute Hydrocephalus. London, 1848.

§ On the Nature, Causes, Prevention, and Treatment of Acute Hydrocephalus, or Water-Brain Fever. London, 1845.

the "unsuccessful treatment of the disease as a mere routine, without hope, without encouragement, without comfort, and without consolation; meeting in consultation in such cases, merely to reflect reciprocal humiliation, and to indulge in reciprocal confessions of incompetency" (iv.), "determined to try to lay down a *beacon* or two, by means of which even a few lives may be saved, and much misery prevented." (p. v.) The *beacons* thus referred to by the author "view this malady in the light, &c. of an idiopathic nervous fever of infants, strongly allied to the febris lenta nervosa of adults."

In 1847, appeared the series of papers by M. Rilliet, 'De l'Inflammation Franche des Méninges chez les Enfants (Arachnitis de la Convexité de Parent et Martinet).'* M. Rilliet first remarks, that the denomination of acute hydrocephalus is synonymous with that of tuberculous meningitis, or "meningitis of the base," and that we may employ one term for the other. He then proceeds to point out how many have confounded together all the acute maladies of the brain in children under these two denominations; that along with M. Barthez, he was the first to distinctly separate and describe the simple from the tuberculous form of meningitis; but that, notwithstanding, since then, MM. Delcour, Bouchut, Barrier and the able Professor of Therapeutics at the Faculty of Medicine, have almost neglected to mention the former variety. The two diseases, however, differ entirely in their causes, progress, termination, and anatomic characters, as well as in regard to treatment,—in fact, they differ from each other as much as do pneumonia and phthisis. Both MM. Rilliet and Barthez believe that every meningitis developed under the influence of the tuberculous diathesis is itself tuberculous, with granulations deposited in the meshes of the pia mater, near the inflamed parts; in other words, the meningitis of tuberculous subjects and tuberculous meningitis are one and the same affection.† Both occupy the base of the brain; both consist in a thickening of the pia mater, and in an infiltration of false membranous matter or concrete pus in its meshes; both are accompanied by ventricular effusion, and often coincide with cerebral tubercles; and in both, tuberculous deposit is never wanting in some other organ. In simple meningitis, on the contrary, it is the pia mater, and sometimes the arachnoid, of the *convexity* or of the ventricles which are inflamed, often to considerable extent, and infiltrated with pseudo-membranous and purulent liquid deposits. The inflammation of the convexity, moreover, is only exceptionally accompanied by ventricular effusion, and does not coincide with meningeal or cerebral tubercle, or with miliary granulation in other organs, as does tuberculous meningitis,—the disease usually representing acute hydrocephalus. "These differences, which M. Barthez and myself have already‡ expressed in detail, are so decided, that if we are shown the brain of a child in which the fissure of Sylvius is agglutinated, and

* Archives Générales de Médecine, &c., tom. xii., quatrième série, p. 385.

† In a note contained in the new edition of the 'Traité Clinique et Pratique,' &c., MM. Rilliet and Barthez assert they have been misunderstood in reference to the above points. They remark—"We speak of meningitis which becomes developed *under the influence of the tuberculous diathesis*, and not of that which may be simply *developed in tuberculous subjects*, for there cannot be the least doubt that a child may be attacked with a truly inflammatory meningitis notwithstanding the presence of some tubercles." (Op. cit., vol. i. p. 99.)

‡ Traité Clinique, &c.

pseudo-membranous or concrete purulent infiltration exists at the base, whilst the arachnoid and the pia mater of the convexity are uninflamed, we do not hesitate to affirm, on this simple examination, and without further microscopic investigation, that most probably there are granulations in the meninges, that the ventricles are or have been distended by serous effusion, and that there certainly exists tuberculous deposit either in the lungs or bronchial glands, or elsewhere." "We could affirm that the acute symptoms have been preceded by *prodromata*, that the outbreak was insidious, that the meningitis was announced by vomiting, constipation, and moderate cephalalgia, without acute fever; that the intelligence was intact at any rate during the first week, and that the disorder lasted from fourteen to twenty-one days." (p. 396.) "On the other hand, on being shown the brain of a child, where the convexities of the hemispheres are covered with purulent deposits or false arachnoidian membranes to considerable extent, we do not hesitate to affirm, without fear of being contradicted by experience, that no tuberculous deposit is to be found either in the meninges, brain, or elsewhere; that the outbreak was abrupt and violent, introduced by convulsion if the patient was very young, by vomiting, constipation, and violent headache if the child was older. That the symptoms were followed after from one to three days by formidable phrenesis, and that the course of the whole malady was very short—viz., three, four, or six days."* Further, simple acute meningitis (*méningite franche*) is very rare, in comparison with tuberculous meningitis or acute hydrocephalus. In a further essay by M. Rilliet,† it is remarked that external and internal meningitis offer no sensibly different symptoms to those of simple peripheral meningitis, and that, therefore, they had been previously included‡ under the same description. But whether the like held good when isolated inflammation of the ventricular membrane is compared with peripheral inflammation of the arachnoid and pia mater is another matter. Into the discussion of this point we need not enter, but shall simply content ourselves with making the following extract from M. Rilliet's observations in the paper above alluded to. "The greater number of pathologists *au courant* with modern views, agree in admitting that the effusion met with in the disease known under the name of acute hydrocephalus by Whytt and Fothergill, is nothing but a result of tuberculous inflammation, or of tuberculization of the meninges. In other terms, they are unanimous in denying that serous effusion into the ventricles constitutes a regular *primitive* affection. We lay stress upon the term *primitive*, because *secondary* hydrocephalus, independent of all cerebral lesion, is far from being rare; no physician being ignorant, that during convalescence from scarlatina, in œdematous children, severe cerebral complications often arise, as the result of ventricular effusion. The same thing is occasionally witnessed after measles and some other disorders."§

In 1847, appeared the useful compendium on pædiatrics, in the 'Bib-

* Op. cit., vol. xii. p. 396.

† De l'Inflammation limitée à la Membrane Séreuse Ventriculaire et sur sa terminaison par une Hydrocéphalie Chronique: Archives Gén. de Méd., &c., tom. xv. p. 433, 1847.

‡ Traité Clinique, et Arch. Gén., 1846.

§ See upon this point a paper by M. Rilliet, on Encephalopathia Albuminurica, in vol. xxi. of the Journal für Kinderkrankheiten (p. 69), Aug. 1853.

liothèque du Médecin Praticien,' under the direction of Dr. Fabre. In it there is certainly a chapter having for its title the old term "Acute hydrocephalus," but it commences with observing, that this term, after having occupied for ages one of the first places in infantile pathology, is now almost erased from the nosologic list. Having allotted, then, the various affections formerly included under this common title, their proper places, and given them their true designations—viz., simple meningitis, tuberculous meningitis, &c., &c., it is proper to determine whether there really exist any facts warranting the description of such a disease as *hydrocephalus.* Before doing so, however, it is necessary that the signification of the term be subjected to analysis. "If it be meant to imply an effusion independent of any alterations of the fluids and solids of the body, we shall probably be right in not admitting *hydrocephalus,* although the presence of any such presumable alterations may with difficulty be demonstrated; nay, we have perhaps reason for contesting its existence, independent of some marked disturbance past or present. But on the other hand, if by the term hydrocephalus we are to understand an effusion of serous fluid unaccompanied by actual lesions of the parietes of the containing cavity, or an effusion whose symptoms are due to the mechanical action, such effusion itself exerts on the neighbouring structures; in other words, if we bestow upon this term the same sense that we have given, and which everybody else gives, to other dropsies of the serous membranes, such as of the peritoneum, pericardium, pleura, &c., then *hydrocephalus* exists, and that under two phases."* The two forms described by the author are the *simple* and *chronic,* this latter being only a variety of the ordinary chronic and congenital hydrocephalus, may here be left unnoticed; with respect to the other, the simple acute or *essential hydrocephalus,* the conclusion is arrived at that "the cases in which an effusion of fluid has been shown to have suddenly taken place without previous or coincident inflammation, are very rare, but nevertheless such cases have occurred without doubt. . . . . Hydrocephalus becomes *essential* when the cause which produces it limits its entire action to the production of the cerebral effusion; consequently, in our view, essential hydrocephalus must be *primitive.*" (p. 174.) We may just remark that this essential hydrocephalus of the writers in the 'Bibliothèque' represents certain forms of the *wasser-schlag* or *water-stroke* of Gölis and the Germans. "Acute hydrocephalus" is, therefore, described by them under the two forms of meningitis, *simple* and *tuberculous,* the latter being considered, however, to represent the disease κατ' ἐξοχην, and which is in the main illustrated, of course, by the views of MM. Fabre and Constant, previously alluded to. In 1847, Dr. West† advocated opinions accordant with the advanced pathology of the continental writers, affirming that "inflammation of the brain occurs in early life under two different conditions. It now and then comes on in previously healthy children, but occurs much oftener in connexion with the tuberculous cachexia, or as the result of tuberculous deposit in the brain or its membranes. The term encephalitis may be properly used to denote the cases of simple inflammation of the brain, while we may with advantage restrict the term acute hydrocephalus to cases of cerebral inflammation in

* Op. cit., vol. ii. p. 172. † Medical Gazette, July 2, 1847.

scrofulous subjects." In the same year also* Dr. Willshire expressed himself in much the same terms, maintaining "acute hydrocephalus" to be ordinarily meningitis of a tuberculous character, but admitting that "there occur also a limited number of cases in which there are seen evidences of inflammation of the pia mater at the base, sometimes at the convex surfaces of the brain, too, in which the effusion is always *concrete*, but yet no distinct tuberculous matter or granulations are to be detected by the most careful observation. These cases, accompanied often by effusion into the ventricles, run the same course, present the same category of symptoms, as do the others, and occur in a like scrofulous constitution. These are cases of scrofulous meningitis." Between tuberculous or scrofulous meningitis and simple acute meningitis the distinction was also drawn. In Dublin, Dr. Valentine Duke,† in 1849, supported the doctrine that "acute hydrocephalus" is tuberculous meningitis, and preserved the separateness of the latter from the simple acute affection. But in 1850, from the same school quite opposite doctrines proceeded, as will be seen from the following analysis of Dr. Churchill's opinions.‡ The latter writer preferred denominating our present disorder by "the simple terms prefixed to his chapter," and which were these three—acute meningitis, acute arachnitis, acute hydrocephalus. The affection thus included is said to be an inflammation of the membranes of the brain, and it is maintained that between the several forms described by the author there is very little difference of symptoms and character as met with in practice. (p. 126.) The reader is cautioned against supposing he will always find the exact series of symptoms laid down by the various writers on tubercular meningitis, "for nothing can be more variable than they are," (p. 126,) and it is "better to include both [acute and tuberculous meningitis] under one name, and to describe them as two (out of many) phases of the same disease." (p. 115.) An attempt has been made to distinguish between them, but without success, except in extreme cases, but in the majority the course and symptoms are so similar, that unless we have some collateral circumstances to guide us no positive diagnosis is possible. (p. 133.)

In the period we have just glanced over there have been a few observers who, agreeing as to the spirit of the doctrine that "acute hydrocephalus" is a *specific* miningitis, and without denying the close relationship which exists between the scrofulous or tuberculous diathesis and the meningitis in question, yet demur to the opinion that the exact tuberculous nature of the granular deposit or exudation itself met with in the cerebral membranes is plainly determined. It has also been a matter of dispute in what relationship of cause and effect the granular deposit and the inflammatory process going on stand in towards each other, some viewing the granules as giving rise to or exciting the inflammation, while others believe the latter to cause the granular deposit. Upon these points we cannot dwell in detail, but must refer the reader to the treatises of MM. Rilliet,

* Medical Times, July 8, 1847. See, also, Lancet, for 1853, 4.

† An Essay on the Cerebral Affections occurring most commonly in Infancy and Childhood. Dublin, 1849.

‡ The Diseases of Children. Dublin, 1850.

Becquerel, and Lebert, &c.,* closing the intricate matter before us with the following references to the lately advanced (1853) opinions of M. Bouchut, and of M. Henri Hahn (1853).

According to the author of the 'Traité Pratique,' &c.,† there are two forms of meningitis—viz., simple and granular. The two forms are quite different from each other, and the latter constitutes the acute hydrocephalus of Whytt and others. Granular meningitis is especially developed in children who are already a prey to the tuberculous cachexia; in these cases a latent inflammatory process is present in the membranes, a process capable of determining the formation of granulations. The latter themselves are then capable of exciting acute inflammation, upon the occurrence of which (whether from this or other causes), and its superaddition to already established lesions, the fatal disorder supervenes. "Microscopic analysis has demonstrated in an incontestable manner, that these granulations of the serous membranes and of the pia mater are composed only of fibro-plastic tissue, and not of tuberculous matter." (p. 235.) "I have never been fortunate enough to observe, as some respectable writers have done (Barrier, &c.), the gradual transformation of these fibro-plastic granulations from the simple minute point of whitish fibrine which is their origin up to the tubercle which is their last degree of development. The intermediate state between these two extremes is always wanting, and we are even yet ignorant as to whether the tubercles of the periphery of the brain are primitively developed in the cortical substance, and afterwards contract adhesions with the pia mater, or whether they have their birth in the latter, and afterwards involve the brain." (p. 244.)‡ Finally, according to M. Hahn,§ the last essayist on our present subject, the greater number of cases registered in France, Germany, and England, as those of acute hydrocephalus, are represented by "tuberculous meningitis." The latter constitutes Whytt's disease, whose true nature nevertheless, it is remarkable, is still unrecognised by some, and which is only explainable by the confusion in which the denomination of acute hydrocephalus has involved the matter. Under this latter term essentially different diseases have been comprised, but it is as meningeal inflammation, influenced by the tuberculous diathesis, that the mass of cases so denominated must be regarded. In affirming this, "it must not be concluded that this meningitis is always found in constant connexion with cerebral or meningeal tuberculisation. For although in children dying from tuberculous meningitis cerebral or meningeal tubercles are pretty frequently observed, yet they are not always so." (p. 12.) Thus substantiating, we may remark, the views already alluded to as taught in 1847 by the author of the present paper.||

* See, in particular, Malmsten, in Journal für Kinderkrankheiten, vol. xxi. p. 142.

† Traité Pratique des Maladies des Nouveaux-nés, &c., par E. Bouchut. Paris, 1852.

‡ A critique on MM. Bouchut and Robin's views will be found in vol. iii. (just published) p. 386, of the Traité Clinique et Pratique, &c., of MM. Rilliet and Barthez.

§ De la Méningite Tuberculeuse Etudiée au Point de Vue Clinique. Par Henri Hahn. Paris, 1853.

|| See Medical Times, 1847.

Art. IV.

The Action of Liquor Potassæ on the Urine in some Chronic Diseases. By E. A. Parkes, M.D., Professor of Clinical Medicine in University College, London.

The influence of liquor potassæ on the urine in health and in acute rheumatism having been considered in the two former papers,* I proceed to relate the experiments made to determine the effect of this remedy on the urine in certain chronic diseases. The experiments were conducted by choosing patients in whom no rapid morbid change was going on, and by determining the amount of the urinary constituents before, during, and after the administration of liquor potassæ.† As the disease was nearly stationary, and as the diet and the other external circumstances remained, as far as possible, the same, it does not appear that any important source of fallacy can have interfered with the accuracy of the results.‡

The amount of the urinary constituents varies considerably from day to day, being sometimes more, and sometimes less, than the average of several days; but it would appear that in the state of health and in chronic diseases which present no rapid changes, the lessened excretion of one day is compensated by the increased excretion of the next, and the average of five or six days is the same as the average of the next five or six days. In the following experiments, therefore, after the patients had been in the hospital a short time, so as to become accustomed to the diet, the urine was examined during six or seven days; liquor potassæ was then given for an equal length of time, all other medicine being, of course, avoided, and then, the potash being discontinued, the analyses were continued for another five or six days.

In the two last cases, the sulphuric acid was the only ingredient whose quantity was determined with regularity.

The liquor potassæ was administered in half-drachm or one-drachm doses with water, and at times when the stomach was presumed to be freest from acidity. It has already been shown that if the potash be neutralized by the acids which are present in the stomach during digestion, it does not produce the same effects as when it is taken unneutralized into the system. In the one case a neutral salt merely passes into the circulation; in the other, the alkalinity of the blood is increased.

I have thought it advisable to give all the items of the experiments, and also to mention, when such is known, the weight and height of the patient, though I have based no calculations upon them, as it was not necessary for my present purpose.

* See Nos. 21 and 25.

† The liquor potassæ was prepared according to the London Pharmacopœia, = 6·7 per cent. of pure potash.

‡ For the convenience of calculation, the urine was measured in cubic centimetres (1 cc. = ♏xvi½), and this measure has been kept in the tables. All the other weights are English grains. The urea and chloride of sodium were determined (according to Liebig's plan) by my assistants, Mr. de Tunzelmann and Mr. Nesfield. On the accuracy of these two gentlemen I have a perfect reliance. I determined myself the other ingredients,—viz., the solids, by evaporation; the sulphuric and phosphoric acids by baryta, and by washing and weighing the precipitates. I preferred this plan to the method by test solutions, as being more certain—at least, in my hands. The uric acid, the creatine, creatinine, and the earthy bases, were not determined, as it was impossible to examine into every point; but the aggregate quantity of these substances can be easily ascertained by a simple calculation.

In the following observations the cases are related in the briefest possible manner, and merely for the purpose of showing the nature of the disease under observation.

CASE I. Clement Hall, aged 30, height 5 feet 4 inches, weight 114 lbs. Chronic lead paralysis, the extensors of the arms being greatly, and the flexors slightly, affected. The health otherwise very good; no disease of the nervous system, and no disease of any of the thoracic or abdominal organs.

TABLE I.

Date.	Food.	Medicine.	Urine of 24 hours. Quantity in cubic centim.	Solids.	Urea.	Cl Na.	SO_3.	$Ph O_5$.
June 10	Meat ℥v, bread ℔j, potatoes ℔ss, milk ℥iv, gruel ℔j.	None.	1175	602·540	...	...	24·272	11·470
„ 11	„ „	„	Lost.					
„ 12	„ „	„	1387	680·674	428·305	117·784	30·486	16·358
„ 13	„ „	„	1260	. .	351·846	87·962	25·672	14·653
„ 14	„ „	„	800	495·360	259·392	55·584	21·310	9·997
„ 15	„ „	„	1900	579·890	...	.	29·059	30·390*
„ 16	„ „	„	1050	.	...	81·666	25·443	11·617
„ 17	„ „	Liq. pot. ℥ii.	1560	519·792	409·470	120·432	28·590	11·117
„ 18	„ „	„	1512	679·190	349·132	116·765	28·853	12·451
„ 19	„ „	„	1512	679·190	349·132	116·765	28·853	12·451
„ 20	„ „	„	1280	676 096	415·027	78·930	30·797	15·831
„ 21	„ „	„	1280	676·096	415·027	78·930	30·797	15·831
„ 22	„ „	„	Lost.					
„ 23	„ „	„	1555	763·505	384·147	120·050	34·794	9·147
„ 24	„ „	„	1075	637·840	336·206	155·180	25·564	7·563
„ 25	„ „	„	1605	...	322·155	111·554	29·283	11·070
„ 26	„ „	„	1605	...	322·155	111·554	29·283	11·070
„ 27	„ „	None.	1225	526·505	274·253	75·656	20·631	11·880
„ 28	„ „	„	1375	593·725	329·065	106·150	23·866	10·624
„ 29	„ „	„	1900	730·740	321·152	176·016	25·338	8·474
„ 30	„ „	„	970	575·640	262·010	119·814	23·238	7·279
July 1	„ „	„	1475	580·855	333·223	148·031	23·475	10·748
„ 2	„ „	„	1137	475·028	254·113	79·033	22·854	6·471
„ 3	„ „	„	1137	475·028	254·113	79·033	22·854	6·471
„ 4	„ „	„	860	559·860	321·960	73·130	27·490	15·055

Averages in each 24 hours.

	Solids.	Urea.	Cl Na.	SO_3.	$Ph O_5$.
Before liquor potassæ ...	589·693 ...	346·514 ...	85·724 ...	26·040 ...	12·819
During liquor potassæ ...	661·672 ...	366·826 ...	112·240 ...	29·649 ...	11·867
After	566·422 ...	293·736 ...	106·758 ...	23·718 ...	9·625

Thus this man took in each 24 hours about 8 grains of pure potash, and if we refer to the amount excreted before and during the use of the medicine, we find that there was an increase in the solids of the urine of 72 grains daily, in the urea of 20 grains, and in the sulphuric acid of 3½ grains. There was no increase, but even a slight decrease, in the phosphoric acid. The chloride of sodium was increased. The augmentation in the urea, chloride of sodium, and sulphuric acid leaves 14 grains of solids still unaccounted for. It is to be presumed, then, that the extractives were increased.

* The phosphoric acid is excluded from the averages.

CASE II. John Flemming, aged 22, height 5 feet 6 inches, weight 117lbs. Chronic eczema of both forearms, and slightly of both thighs; duration of the disease several years.

TABLE II.

Date.	Food.	Medicine.	Urine of 24 hours. Quantity in cubic centim.	Solids.	Urea.	Cl Na.	S O_3.	Ph O_5.
May 3	Bread ℔j, meat, potatoes ℔ss, gruel ℔j, milk ℥iv.	None.	550	424·710	271·74	84·92	20·112	4·658
„ 4	Same, but no meat or potatoes.	„	1060	720·588	409·16	98·198	34·246	12·132
„ 5	Same, with meat.	„	680	557·600	293·977	73·494	25·172	8·539
„ 6	„ no meat.	„	...		382·912	92·66		
„ 9	„ no meat.	„	1200	837·36	500·256	129·696	32·623	11·255
„ 10	„ meat.	„	1300	700·5	...	..	33·926	16·657
„ 11	„ no meat.	Liq. pot. ʒss.	1075	606·945	381·751	96·5	26·086	13·309
„ 12	„ meat.	Liq. pot. ʒii.	1775	623·845	411·09	123·327	36·422	26·243
„ 13	„ no meat.	„	860	574·308	371·795	79·671	30·003	3·740
„ 16	„ no meat.	„	1075	...	448·146	116·186	30·151	19·313
„ 17	„ meat.	„	1475	723·93	..	...	35·742	21·573
„ 18	„ no meat.	„	1350	812·43	...	...	36·193	5·033
„ 19	„ meat.	„	1090	...	504·898	134·636	36·348	29·703
„ 20	„ no meat.	Liq. pot. ʒiii.	775		400·844	95·729	30·764	9·706
„ 21	„ meat.	„	1270	748·030	490·22	117·653	37·759	17·119
„ 22	„ meat.	„	1270	748·030	490·22	117·653	37·759	17·119
„ 23	„ no meat.	Liq. pot. ʒii.		...	489·641	91·096		
„ 24	„ meat.	„	1150	679·42	550·436	88·78	31·028	6·179
„ 25	„ no meat.	None.	960	624·575	...	...	29·793	6·440
„ 26	„ meat.	„	870	671·256	..	..	34·727	13·029
„ 27	„ no meat.	„	775	552·095	358·98	83·762	24·145	14·146
„ 28	„ meat.	„	697	433·394	387·698	75·385	28·868	10·149
„ 29	„ meat.	„	697	433·394	387·698	75·385	28·868	10·149
„ 30	„ no meat.	... ...	668	448·762	335·278	89·112	27·665	11·575
„ 31	„ meat.							
June 1	... ...	... ...	...	...	356·278	95·342		
„ 2	... ...	... ...	...	...	411·09	75·27		

Averages in each 24 hours.

	Solids.	Urea.	Cl Na.	S O_3.	Ph O_5.
Before liquor potassæ	660·151	371·569	95·793	29·215	10·648
During „ „	689·646	454·503	106·123	33·475	15·367
After „ „	527·246	372·837	82·375	29·011	10·914

This patient took in every 24 hours at least 8 grains of pure potash, except on three days, when he took 12 grains. The solids were augmented by 30 grains, the urea by 80 grains; the sulphuric acid by 4 grains, and the phosphoric acid by 5. The chloride of sodium was increased. After treatment the amount returned to the average before treatment, except in the case of the solids, which were diminished. That the increase of the urea was apparently more than that of the solids, was probably caused by the examinations of the two substances not being always made on the same day. As the patient did not take meat regularly every day, a calculation has been made to see if this change of diet at all affected the results, but it is found not to have done so.

CASE III. Thomas Martin, aged 40, weight 112lbs. Chronic phthisis; both lungs affected to a considerable extent, chiefly (as proved by post mortem examination some months subsequently) by grey infiltrated tubercle.

TABLE III.

Date.	Food.	Medicine.	Urine of 24 hours. Quantity in cubic centim.	Solids.	Urea.	SO_3.	PhO_5.
Oct. 27	Meat ℔ss,* bread ℔j, potatoes ℔ss, gruel ℔j, milk ℥iv.	Ol. morrh. ℥iss.	2000	590·65	475·640	18·423	8·267†
„ 28	„ „	„	1460	648·24	405·866	22·833	9·285
„ 29	„ „	„	2190	562·251	313·316	15·808	6·049
„ 30	„ „	„	1785	...	...	18·981	14·093
„ 31	„ „	„	1785	...	.	18·981	14·093
Nov. 1	„ „	„	1780	..	329·966		
„ 2	„ „	„	2325	631·50	319·066	16·746	7·689
„ 3	„ „	Liq. pot. ℥iss, no ol. morrh.	2175	807·80	436·658	19·436	17·154
„ 4	„ „	„	2225	706·82	481·074	24·471	19·093
„ 5	„ „	„	2250	804·95	382·234	22·767	11·658
„ 6	„ „	„	2300	736·226	335·208	19·381	13·19
„ 7	„ „	„	2400	792·83		18·313	11·449
„ 8	„ „	None.	1700	738·18	248·725	22·785	12·631
„ 9	„ „	„	1475	595·65	193·488	17·852	12·001
„ 10	„ „	„	950	597·90	262·584	16·535	11·104
„ 11	„ „	„	2000	...	401·544	19·209	8·267
„ 12	„ „	„	340	...	147·026	7·806	5·189‡
„ 13	„ „	Ol. morrh. ℥iss.	1100	...	271·812	14·933	6·995
„ 15	„ „	„	1330	...	287·258	17·119	10·658
„ 16	„ „	„	1040	...	281·000	12·867	5·655
„ 17	„ „	„	1450	..	358·220	14·305	10·697
„ 18	„ „	„	820	...	266·956	9·864	8·474§

Averages in each 24 hours.

	Solids.	Urea.	SO_3.	PhO_5.
Before liquor potassæ, and during cod-liver oil ...	608·160	369·770	18·628	9·912
During liquor potassæ	781·725	408·788	20·873	14·508
After „ „	643·910	271·533	16·950	9·758

This patient took 6 grains of pure potash in each 24 hours. During this time the solids were augmented by 172·565 grains, the urea by 40·018, the sulphuric acid by 2 grains, and the phosphoric acid by 4½ grains. The effect of the withdrawal of the cod-liver oil may have had some influence, as it appears from Bischoff's experiments that fat limits the metamorphosis of tissue, and therefore its withdrawal would necessarily lead to an increase in the urinary solids, on account of the augmented decomposition which would then go on. The extraordinary augmentation of the urinary solids may then have been partly due to this cause. It will be observed that, as the urea was not increased to anything like the same amount as the solids, there must have been a great excretion either of the chloride of sodium or of extractives; unfortunately the amount of the chloride of sodium was not determined.

* This patient had meat four days in the week, and a pint of soup the other days.
† On the 26th and 27th there was only a trace of chloride of sodium in the urine.
‡ Much vomiting. This observation is omitted from the averages. § Ibid.

CASE IV. James Ely, aged 14. Chronic peritonitis; fluid in the peritoneal cavity. The cause of the peritonitis could not be determined; there was no evidence of its being tuberculous; there was no lung tuberculosis, and no disease of the liver or other organs. The pyrexia was very slight, and the general health apparently little affected.

TABLE IV.

Date.	Food.	Medicine.	Urine of 24 hours. Quantity in cubic centim.	Solids.	Urea.	Cl Na.	SO_3.	PhO_5.
May 3	Bread lbj, milk Oij.	Small alterative doses of hyd. c. cretâ, and pulv. rhei.	640	350·168	256·584	39·526	15·838	13·289
„ 4	„ „	„	540	398·368	258·465	33 35	18·560	10·096
„ 5	„ „	„	1000	402·200	248·04	61·76	15·708	5·914
„ 6	„ „	„	1450	. .	268·656	67·164		
„ 8	„ „	„	700		237·776	54·04		
„ 9	„ „	„	1040	411·632	. .	. .	20·553	10·315
„ 10	„ „	„	700	418 180	261 392	43·232	19·161	10·684
„ 11	„ „	Liq. pot. ʒj.	500	445·10	256·78	30·88	22·461	9·841
„ 12	„ „	Liq. pot. ʒij.	1075	410·024	273 667	.	21·541	7·554
„ 13	„ „	„	540	363·528	209·675	50·025	17 911	6·387
„ 17	„ „ fish.	„	725	577·390	...	...	27·410	14·935
„ 18	„ „	„	467	...		..	23·434	9·397
„ 19	„ „	„	540	.	300·151	37·519		
„ 20	„ „	„	784		350·096	61·821	34·624	13·885*
„ 21	„ „	„	815	506·278	..	...	31·061	12·629
„ 22	„ „	„	815	506 278	..	.	31·061	12·629
„ 23	„ „	„			388·702	05 342		
„ 24	„ „	Liq. pot. ʒiss.	1370	565·810	370·174	137·433	29·852	15·113
„ 25	„ „	„	750	487·150	. .	...	26·294	6·773
„ 26	„ „	„	705	454·866	.	.	20·806	12·352
„ 27	„ „	„	1050	417·55	321·924	81·06	20·570	8·612
„ 29	„ „	None.	850	537·71	334·662	61·62	27·406	10·135
„ 30	„ „	„	689	489·741	312·66	52·11	23·823	11·788

Averages in each 24 hours.

	Solids.	Urea.	Cl Na.	SO_3.	PhO_5.
Before liquor potassæ ...	395·909	255·152	49·845	17·964	10·159
During „ „ ...	476·397	309·643	70·585	25·635	10·838

The two last observations have been disregarded, as the time was too short for a fair comparison; their average is above that of either of the previous periods in the case of all the ingredients, but it is probable that had the examination been carried on for 4 or 5 days more, the lessened excretion of these days would have reduced the high average of the two days in question.

This boy took in each 24 hours about 8 grains of pure potash (or pe[illegible]s a grain more); the solids were increased by 80 grains, the urea by [illegible] sulphuric acid by 7½; the phosphoric acid was unaltered. There w[illegible]n increase in the chloride of sodium. The increase in the urea, [illegible]ride of sodium, and sulphuric acid, accounts for all the increase in the [illegible]ds, so that the extractives were, in this case, unaffected.

* Ascites disappearing.

Case V. John Synin, aged 45. Chronic pleurisy of many months' duration. It seemed probable that the lower part of the left pleura was covered with thick, tolerably solid exudation, and that the breathing power was diminished from this cause. The chief symptoms were dry cough, dyspnœa on exertion, abolition of vocal fremitus over lower lobe of left lung, dull percussion note, and very feeble vesicular respiration, with slight crackling and grazing friction in same position, but without bronchial respiration; voice slightly brochophonic; no dilatation nor contraction of side; expansion movements lessened; heart not displaced. Supplementary respiration in the right lung.

Table V.

Date.	Food.	Medicine.	Sulphuric acid in each 24 hours.	Remarks.
June 5	Bread lbss, milk ʒiv, barley-water Oij.	Blue pill, antimony, and opium.	30·250	
„ 6	„ „	„ „	30·818	
„ 7	„ „	„ „	25·532	Very slight ptyalism.
„ 8	„ „	None.	...	Urine lost.
„ 9	„ „	„ „	..	Urine lost.
„ 10	„ „	„ „	24·875	
„ 11	„ „	„ „	32·612	
„ 12	„ „	Liq. potassæ ʒij, pot. iodidi grs. xv.	31·304	
„ 13	„ „	„ „	28·680	
„ 14	„ „	„ „	32·868	
„ 15	„ „	„ „	32·410	
„ 16	„ „	„ „	26·887	
„ 17	„ „	„ „	27·180	Copious vomiting before taking the medicine.
„ 18	„ „	Liq. potassæ ʒiij.	37·25	
„ 19	„ „	„ „	...	Lost.
„ 20	„ „	„ „	30·144	
„ 21	„ „	„ „	46·907	
„ 22	„ „	„ „	41·268	
„ 23	Same diet, fish added.	„ „	35·187	
„ 24	„ „	„ „	42·676	
„ 25	„ „	„ „	..	Lost.
„ 26	„ „	„ „	39·688	
„ 27	„ „	„ „	40·042	
„ 28	„ „	„ „	44·138	
„ 29	„ „	None.	42·403	
„ 30	„ „	„ „	25·158	
July 1	„ „	„ „	30·222	
„ 2	„ „	„ „	31·824	
„ 3	„ „	„ „	25·254	
„ 4	„ „	„ „	27·183	

Averages in each 24 hours.

	SO_3.
Before liquor potassæ, and during slight ptyalism, five days	28·817
During liquor potassæ and iodide of potassium, six days	29·943
During liquor potassæ alone, nine days	39·742
After liquor potassæ, six days	30·355

During the administration of 8 grains daily of pure potash and of 15 grains of iodide of potassium, the average excretion of sulphuric acid was increased by one grain daily; the iodide of potassium being then discontinued, and the potash increased to 12 grains, the average excretion of the sulphuric acid was increased by nearly 11 grains. It fell almost to the former average when the potash was discontinued. None of the other urinary ingredients were determined. In this case the diet was

altered by the addition of fish during the use of the potash, and after the cessation of the remedy. It is evident that this change had no effect on the excretion of sulphuric acid.

Case VI. James Holton, aged 16. This was a complicated chronic case; there was enlargement with tenderness of the liver, with slight jaundice, without deficiency of bile in the stools; the spleen was not enlarged; the alimentary canal was healthy; the urine was not albuminous; it contained bile, and deposited at first copious red lithates. There was a little dry bronchitis. There was no fluid in the pleuræ. The following were the cardiac signs. Bulging in cardiac region; heart's impulse neither seen nor felt on first admission; precordial dulness increased upwards to the first left cartilage, and transversely to the right of the sternum; no valvular murmurs; after a few days slight unequivocal friction at the third left cartilage, and at the adjoining part of the sternum. During the patient's stay in the hospital (more than a month) there was a very slight diminution in the amount of precordial dulness, but no increase of friction. It was supposed that the bulging and extended precordial dulness were attributable to fluid in the pericardium, and from the friction at the base it was presumed that the fluid was the result of inflammatory action. The patient had not, and never had had, any rheumatic symptoms; there was no evidence of renal disease; there had been no previous scarlatina, variola, measles, typhus, or typhoid fever, or any specific disease which could explain the pericarditis.

Table VI.

Date.	Food.	Medicine.	Sulphuric acid.
June 15	Bread ℔ss, milk ℥iv, barley-water Oij.	None.	24·090
" 16	" "	" "	28·965
" 17	" "	" "	23·037
" 18	" "	Liq. potassæ ʒij.	24·032
" 19	" "	" "	32·799
" 20	" "	" "	40·401
" 22	" "	" "	43·290
" 23	" "	" "	44·574
" 24	" "	None.	38·500
" 25	" "	" "	26·700
" 26	" "	" "	19·516
" 27	" "	" "	27·300
" 28	" "	" "	24·771

Averages in each 24 hours.

	SO_3.
Before liquor potassæ	25·364
During " "	37·019
After " "	27·357

Eight grains of potash, or perhaps a little more, being taken daily, the excretion of sulphuric acid was increased by nearly 12 grains. The other ingredients were not determined.

The mode of conducting the inquiry, and the results obtained, being apparent from the tables, it seems unnecessary to occupy space by an ex-

tended analysis of the observations. With respect to the method employed, it is presumed that the observations were carried on during a sufficient length of time to neutralize all the chances of error which might occur from the variability of the conditions which are usually supposed to influence the metamorphosis of tissue, and the composition of the urine, such as changes in the amount and kind of food, and of exercise, and differences in the condition of the nervous system.

1. The effect of liquor potassæ on the water of the urine cannot be judged of from these cases, as the whole quantity of fluid drunk was not known.

2. As it appears that in health the whole of the potash taken as medicine escapes with the urine, it is to be presumed that it did so also in these cases of chronic disease, in which there was no purging or vomiting, or other condition which tends to cause its passage out of the system by some other channel. As in health, so also in these cases, the potash always caused an increased formation and excretion of sulphuric acid. In three of the cases the increase in the sulphuric acid was enough to furnish an acid for all the potash. In two cases the sulphuric acid was not augmented to such an extent, and in these cases the phosphoric acid was found to be increased to about the proportion which would be required by the alkali. In the other case neither the sulphuric acid nor the phosphoric acid was increased in proportion sufficient to neutralize the increased amount of alkali introduced into the system, and some of the potash either did not appear in the urine (which is improbable), or was in combination with an undetermined acid.

3. In all the cases (3) in which the amount of the chloride of sodium was determined, it was found to be increased during the use of the potash. This was an unexpected result, as observations in rheumatic fever had led to the belief that its excretion is not affected by liquor potassæ. But as the urine is not the sole channel of exit of the chloride of sodium, and as the amount of this substance in the urine varies so remarkably, it may be advisable to put out of view the effect of medicines upon it, until its physiological variations are better understood.

4. The solids of the urine as a whole, and the urea in particular, were increased in every case in which they were examined, and, like the sulphuric and the phosphoric acids, their proportion fell to the former standard (or even below it) when the potash was discontinued. This appears to be similar to the effect in rheumatic fever, but it is partly at variance with the observations on the healthy urine, for in this case the solids were found diminished in two cases out of four. The observations on the healthy urine are not, however, comparable with those now made, as the urine of the whole twenty-four hours was not examined, but only the urine passed immediately after the potash had been taken.

If the observations made on the urine of health, of rheumatic fever, and of these chronic diseases, be sufficient to prove that liquor potassæ causes an increase in the amount of sulphuric acid, and occasionally in that of the phosphoric acid, it may be questioned whether the four observations now given are sufficient to satisfy the mind with equal certainty that the solids and the urea are also increased by the use of this remedy. But as a similar increase in the organic solids was noticed in acute rheu-

matism, and as the result in the four chronic cases was constant, it is with confidence assumed that renewed and independent observations will confirm the fact.

5. It appears that the inference drawn from the action of the remedy in health—as to the extractives being increased—held good for one of these cases. In one (a boy), the extractives were not increased; in the rest, their amount was uncertain.

6. The effect on the acidity of the urine (as determined by neutralizing with a solution of soda) was examined in three cases, with the following results:

The free acidity of the urine was equal in any 24 hours to the following amount of crystallized oxalic acid.

	Before Liquor Potassæ.		During Liquor Potassæ.		After Liquor Potassæ.
Case 2 .	62·779 grs.*	...	56·446 grs.†	...	56·640 grs.‡
„ 3 .	32·959§ „	...	28·624§ „	...	22·267§ „
„ 4 .	13·021* „	...	29·156‖ „	...	32·964¶ „

For the exact amount of liquor potassæ taken in these cases I refer to the tables.

It thus appears that the acidity of the urine (which in these cases was evidently quite unconnected with the amounts of phosphoric or sulphuric acids) is scarcely affected by moderate doses of liquor potassæ. In fact, liquor potassæ introduced into a system not deficient in alkali does not take an acid from some other base, but generates for itself as much acid as suffices to neutralize it. It is, therefore, of no use to give liquor potassæ to diminish the acidity of the urine; the carbonates, or the salts which form carbonates, must be employed for this purpose; but even then, if the urine be examined after the immediate alkaline effect of the salt has passed off, its acidity will be found sometimes excessively augmented.

7. An examination was made to see if liquor potassæ caused the appearance of either nitrous or nitric acid in the urine: Price's and the sulphate of iron test were employed, but the results were negative.

It may then be foretold of liquor potassæ, that if taken unneutralized into the blood (in cases in which no violent disturbance is going on in the body), it will cause an increased formation of sulphuric acid in all cases, of phosphoric acid in a minority, and of some other acid (probably an organic) now and then. It will increase also the organic constituents of the urine, especially the urea. Its main effect is, then, to hasten the metamorphosis of some of the albuminous structures of the body, but it may also act on the saccharine and fatty constituents of the body, though no evidence of this is given by the examination of the urine. Its utility in disease is evidently connected with its destructive and eliminating powers. Whether it is more powerful than other alkaline medicines in hastening the metamorphosis of tissue, can only be told by future experiment.

* There was only a single observation in each of these cases.
† Average of eleven days. ‡ Average of seven days.
§ Average of five days. ‖ Average of five days. ¶ Average of two days.

Art V.

Pathological Observations on the Bodies of known Drunkards. Part II.

By Francis Ogston, M.D., Aberdeen.

In a previous article,* the attempt was made to ascertain the injurious effects, of a chronic kind, producible by alcoholic stimuli in excess, on the organs and tissues of the human body, as deduced from the inspection of the cavities after death in 73 individuals known to have been of intemperate habits, and who had all perished suddenly, while in apparent health and vigour, from the effects of accident, suicide, or homicide.

In the present communication, it has been proposed to classify and arrange the results of the inspection of the bodies of 44 additional persons of the same class and habits, who had also perished suddenly, while apparently in ordinary health, but whose death was more directly traceable to the abuse of such stimuli. All of these were known to have partaken of spirits (whisky) in excess immediately prior to their being found dead, or to have been drinking freely for days or weeks previously.

The bodies were examined while fresh, the inspections having commenced, on an average, 25 (24·43) hours after death. Of these, 28 were males, and the remaining 16 were females. The average ages of the former was 50·7; that of the latter, 45·87 years. Four of the males and two of the females were under 35 years of age.

The subcutaneous adipose tissue was abundantly developed in 3 of the males and 7 of the females; the average ages of the former being 53·3, that of the latter 44·7 years. This tissue was deficient in 6 of the females and 10 of the males, averaging respectively 43·6 and 56·8 years of age.

The voluntary muscles were highly developed in 7 of the males, averaging 49·8 years, and much attenuated in 2 of the males and in 3 of the females, averaging together 58·2 years of age. In 1 male, aged 82, the muscles, twenty hours after death, were seen to be dark-red, soft and flabby, and unusually lacerable.

The mass of the blood in 5 of the males was unusually fluid. In 1 of these cases, vibices and spots of purpura were noticed on the surface of the body.

In 1 case the eyelids, and in 1 the legs, were œdematous. In 1 instance the trunk and lower limbs were anasarcous.

Two of the males presented chronic ulcers on the lower extremities.

One male had an old dislocation backwards and upwards of the hip-joint. One male had a double hydrocele.

I. Abnormal Appearances in the Head.

1. *Cranium*, unusually thin in 2:—1 male, 1 female; averaging 46 years.
   unusually thick in 12:—6 males, 6 females; averaging 47·25 years.
   eburnated in 1 male.
   melanotic deposit in the diploe of the, in 1 male.
   frontal sinuses of the, enlarged and containing pus, in
2. *Dura mater*, adherent to the calvarium in 5 cases.
   partial adhesions between the, and the surface of the brain, in 2 cases.
   highly injected in 4 cases.
3. *Arachnoid*, thickened in 34 cases.
   adherent to the dura mater in 2 cases.

* British and Foreign Medico-Chirurgical Review, vol. xiii. p. 502.

serum under the, over the cerebral hemispheres in 36 cases (coincidently with arachnoid thickening in 34).
blood, in a thin layer, under the, in 1 case.
serum under the, at the base of the skull, in 13 cases.
betwixt the, and dura mater, in 1 case.
within the ventricles in 14 cases.

4. *Pia mater* minutely injected in 12 cases.
(coincidently with ventricular effusion in 6, with effusion at the base of the skull in 8.)

5. *Brain*, hypertrophied in 2 cases.
indurated in 13:—highly in 5, partially in 2; coincidently with sub-arachnoid serum in 9, with abundant serum in the ventricles in 2, with serum at the base of the brain in 2, with atrophy of the septum lucidum in 1, with gelatinous effusion on the surface of the hemispheres in 1, with cartilaginous thickening of the lining of the lateral ventricles in 1.
atrophied in 1 case.
softened in 17 (average ages 49 years): generally in 11; in the centre only in 6.
apoplectic in 1 (blood clots in corpus striatum and thal. nerv. opt.)

6. *Cerebellum*, softened in 7 (coincidently with softened cerebrum).
indurated in 2 (coincidently with indurated cerebrum).

7. *Choroid plexus*, vesicles in the, in 7 cases (average ages 46 years).

8. *Conarium*, hypertrophied (with serous cysts in the interior) in 2 cases.

9. *Cerebral arteries*, fatty degeneration of the coats of the, in 1 case.

Abnormal appearances within the cranium, in all, in 43 cases, or in 97·7 per cent. of the whole.

II. Abnormal Appearances within the Chest.

1. *Pleural cavities*, serous effusions into the, in 4 cases.

2. *Lungs*, adhesions of the, to the chest, in 21 cases (both lungs adherent in 12, the right lung in 1, the left lung in 8).
emphysematous in 17 cases (in 12 both lungs affected).
tubercular cavity in one of the, in 1 case (the right).
blood clots in one of the, in 2 cases (the left lung in both).
hepatizations of portions of the, in 11 cases (both lungs affected in 4).
bronchitic, in 2 cases.
atrophy of one of the (the left), in 2 cases.
softening of one of the (the left), in 1 case.
melanosis of the, in 2 cases (in 1 in minute scattered patches, in 1 tumours of the size of a horsebean).

Abnormal appearances in the respiratory organs, in all, in 33 cases, or in 75 per cent. of the whole.

Simultaneous abnormal appearances in the head and respiratory organs in 32 cases.

3. *Mediastinum* loaded with fat in 2 cases.

4. *Pericardium* adherent to the heart in 2 cases.
copious effusion of serum into the, in 2 (in 1 purulent, with flakes of lymph).

5. *Heart*, patch of lymph on the left ventricle of the, in 1 case.
loaded with fat in 9 cases (coincidently with abundant, in 3, and with deficient subcutaneous fat, in 2).
fatty degeneration of the (partial) in 1 case.
general enlargement (hypertrophy) of the, in 12 cases (in 7 coincidently with abundant fat on its surface).
hypertrophy of the left ventricle of the, in 5 cases (in 2 hypertrophy concentric).

dilatation and attenuation of the right, in 14 cases.
tricuspid valve of the, affected in 4 cases (thinned and looped in 2, fringed with warty vegetations in 1, cartilaginous in 1).
mitral valve of the, affected in 7 cases (fringed with warty vegetations in 1, ossified in 2, cartilaginous in 2, cretaceous in 1, patent in 1).
aortic valves of the, ossified in 3 cases.
pale and flabby in 9 cases.

6. *Aorta*, dilation of the ascending, in 2 cases.
bony plates in the ascending, in 2 cases.
bony plates in the abdominal, in 1 case.

7. *Pulmonary artery*, dilatation of the, in 1 case.

Abnormal appearances in the pericardium, heart, aorta, or pulmonary artery, in all, in 26 cases, or in 59 per cent. of the whole.

Abnormal appearances within the chest, in all, in 38 cases, or in 86·3 per cent. of the whole.

III. Abnormal Appearances within the Abdomen.

1. *Omentum* loaded with fat in 4 cases (in 1 reaching to the pubis, in all coincidently with abundant subcutaneous fat, in 1 with abundant fat about the heart).

2. *Stomach* unusually small (atrophied) in 7 cases.
highly congested in 6 cases (interior reddening uniformly on exposure to air).
melanotic spots on the interior of the, in 2 cases.
false melanosis of the, in 12 cases.
inner membrane of the, softened, in 2 cases.
cartilaginous thickening of the pyloric extremity of the, in 1 case.
hour-glass contraction of the, in 4 cases.
hypertrophied, in 2 cases.

Abnormal appearances in the stomach, in all, in 24 cases,* or in 54·5 per cent. of the whole.

3. *Intestines*, unusual contraction of the, in 3 cases (in 2 in the larger, in 1 in the smaller intestines).
displacement of the (scrotal hernia), in 1 case.
softening of the mucous coat of the, in 2 cases (in 1 general, in 1 limited to the duodenum).
atrophy of the, in 1 case (the colon thinned and translucent).
hypertrophy of the duodenal portion of the, in 1 case.
adhesions between the folds of the (at the sigmoid flexure of the colon), in 1 case.
lipoma of the duodenal portion of the, in 1 case.

Abnormal appearances in the intestines, in all, in 8 cases, or in 18·18 per cent. of the whole.

4. *Liver*, general enlargement (hypertrophy) of the, in 19 cases (with adventitious lobes in 1).
partial enlargement of the, in 2 cases (left equalling the right lobe).
cirrhosed, in 1 case.
nutmeg, in 9 cases (in 6 granular, in 3 unusually firm).
granular, in 10 cases (with great enlargement in 8, with fatty patches in 3).
fatty degeneration of the, in 20 cases (in 5 extensive, in 15 partial).
softened, in 1 case.
adherent to the peritoneum, in 1 case.
anæmic, in 8 cases.
unusually congested, in 1 case.

* In one additional case the coats of the stomach at the great cul-de-sac had been acted on by the gastric juice.

Abnormal appearances in the liver, in all, in 36 cases, or in 81·8 per cent. of the whole.

5. *Spleen* indurated (hepatized), in 5 cases.
 hypertrophied, in 7 cases.
 softened, in 7 cases.
 capsule of the, thickened and cartilaginous, in 1 case.

Abnormal appearances in the spleen, in all, in 18 cases, or in 40·9 per cent. of the whole.

6. *Kidneys*, extensive fatty degeneration of the, in 6 cases (surfaces granular in 3, in 3 coincidently with fatty liver, in 2 with granular liver, in 2 with abundant fat about the heart).
 hyperæmia of the in 9 cases (coincidently with nutmeg liver in 3, with granular liver in 3, with fatty liver in 3, with albuminous urine in 1).
 hypertrophy (enlargement) of the, in 14 cases (in 2 confined to the right kidney, in 2 kidneys lobulated, in 2 cortices pale and attenuated, in 1 tubuli obliterated, in 3 extensive fatty degeneration, in 4 marked hyperæmia, in 3 substance softened, in 2 atrophy of the left kidney, in 2 albuminous urine. In 9 coincidently with hypertrophied liver, in 6 with nutmeg liver, in 6 with granular liver, in 5 with fatty liver).
 general atrophy of the 3 cases (both kidneys in 1, right kidney in 1, left kidney in 1).
 partial atrophy of the, in 6 cases (tubuli wasted in 2, cortices in 4).
 partial fatty degeneration of the, in 5 cases (tubuli wasted in 1, cortices attenuated in 1, surfaces granular in 1, urine albuminous in 2, coincidently with fatty liver in 3).

Abnormal appearances in the kidneys, in all, in 28 cases, or in 63·6 per cent. of the whole.

7. *Uterus and its appendages:*
 Steatomatous tumour in the uterine wall, in 1 case.
 Serous cysts in the ovaries, in 5 cases (in both in 3, in the right in 1, and in the left in 1).

Abnormal appearances in the female generative organs, in all, in 5 cases, or in 31·2 per cent. of the sex.

8. *Peritoneum* studded with minute tubercles, in 1 case.

9 *Abdominal cavity*, serum in the, in 2 cases.

Abnormal appearances within the abdomen, in all, in 41 cases, or in 93·1 per cent. of the whole.

Simultaneous abnormal appearances in the head, chest, and abdomen, in 35 cases, or in 79·5 per cent. of the whole.

Simultaneous abnormal appearances in the head and chest, in 37 cases, or in 84 per cent. of the whole.

Simultaneous abnormal appearances in the chest and abdomen, in 36 cases, or in 81·8 per cent. of the whole.

Simultaneous abnormal appearances in the heart, pericardium, aorta, and pulmonary artery, and in the organs of respiration, in all, in 21 cases, or in 47·7 per cent. of the whole.

Simultaneous abnormal appearances in the heart, lungs, liver, and kidneys, in all, in 11 cases, or in 25 per cent. of the whole.

Simultaneous abnormal appearances in the heart, liver, and kidneys, in all, in 14 cases, or in 31·8 per cent. of the whole.

Simultaneous abnormal appearances in the liver and kidneys, in all, in 25 cases, or in 56·8 per cent. of the whole.

Simultaneous abnormal appearances within the head and in the organs of circulation (pericardium, heart, pulmonary artery, and aorta), in all, in 25 cases, or in 56·8 per cent. of the whole.

Entire absence of morbid appearances in none of the cases.

PART FOURTH.

Chronicle of Medical Science.*

ANNALS OF MICROLOGY.

By Robert D. Lyons, M.B., T.C.D., M.R.I.A.
Honorary Professor of Anatomy to the Royal Dublin Society, &c. &c.

[Second Year.]

Part II.—Pathological Micrology.

BLOOD AND BLOODVESSELS.

Blood Cells.—The relation of the white to the red corpuscles, estimated heretofore as 1 : 8 or 1 : 10, is, according to more recent observations of Donders and Moleschott, much below this; they estimate it at 1 : 373; their results are based on the examination of blood from seven individuals at different periods of life. They found the proportion to be, in the ages between $2\frac{1}{2}$ and 12 years, 1 : 226; 30 to 50 years, 1 : 346; old men, 60 to 80, 1 : 381. In females, after menstruation, the numbers were as 1 : 217; females not menstruated, 1 : 405; in pregnant women, 1 : 281. The colourless corpuscles increase after food, and are diminished by fasting. Food rich in albumen increases the quantity of the colourless cells.

* We regret to have to omit the Surgical Report from this number, owing to the indisposition of the reporter. During the months of June, July, and August, we received the undermentioned foreign journals, from which the Reports are chiefly compiled, as it is presumed that the British journals have been already in the hands of our readers.

GERMAN.

1. Archiv für Anat., von J. Müller. 1854, Heft 2 & 3.
2. Archiv für Pathol. Anat., von R. Virchow. Band vi. Heft 4.
3. Annalen des Berlin Charité Krankenhauses. Band v. Heft 1.
4. Archiv des Vereins für wiss. Heilkunde. Band i. Heft 4.
5. Zeitschrift (Henke's) für die Staatsarzneikunde. 1854, Heft 2.
6. Zeitschrift der K. K. Gesell. der Aertze zu Wien, von Hebra. 1854, Mai.
7. Zeitschrift für Rat. Med., von Henle und Pfeüffer. Band iv. Heft 3.
8. Verhandlungen der Phys.-Med. Gesell. in Würzburg. Band iv. Heft 3.
9. Schmidt's Jahrbucher. 1854, Nos. 6, 7, 8.
10. Canstatt's Jahresberichte für 1853. Band iii. iv. v. vi.

FRENCH.

11. Archives Générales de Médecine. Juin, Juillet.
12. Revue Méd. Chir. de Paris. 1854, Mai, Juin, Juillet.
13. Bull. Gén. de Thérapeutique. Mai, Juin, Juillet.
14. L'Union Médicale. Mai, Juin, Juillet.

AMERICAN.

15. American Journal of the Medical Sciences. April, July.
16. Philadelphia Medical Examiner. May, June, July.

EAST INDIAN.

17. Indian Annals. No. 2, April.

SPANISH.

18. Seminario Médico Español. Nos. 12—15.

It is further stated, that during the periods of menstruation, and also during pregnancy, the number of the white corpuscles increases.*

Blood Crystallization.—Bezlin† states, that previous to the publication of Funke and Kölliker's observations, Donders had found crystals in the intestinal canal of leeches which had drawn blood a few days previously. The author has repeated these observations, and finds that in from six to seven days crystals commence to form in the blood contained in the leech, but may be best seen after five weeks. These crystals (according to Bezlin) are not soluble in alcohol or æther; they are dissolved by a concentrated solution of soda, giving an orange-red colour, which sometimes passes into green. They are soluble in ammonia, which produces a peach-blossom colour. By nitric acid the colour is changed to a yellow brown, then to a black, brown black, chesnut brown, and lastly, to a murky dark green. From these and other reactions, he concludes that the crystals consist neither of albumen nor fibrine (Kunde has found them in defibrinated blood) but of hæmatin.

New Formation of Bloodvessels.—MAYER‡ (Dr. Jos.) has investigated the formation of bloodvessels in plastic exudations in the serous membranes, and in wounds of the skin. The small red points and striæ in fibrinous exudations, considered by Hunter as the first stage of the formation of new bloodvessels, he believes, in the majority of cases, to be nothing more than blood-corpuscles which have escaped with the exudation, and which are destined to undergo the usual metamorphosis of extravasated blood. He combats Vogel's views that the new formation of capillaries in exudations originates in branched cells which contain blood, and subsequently unite to form a network. It would appear, however, that the points and striæ in other cases, especially in older exudations, actually present small vascular networks. From the results of observations and experiments, he concludes that the new vessels which appear in an exudation are to be regarded as direct prolongations of those of the tissues on one or both sides of the exudation. The vascular networks in false membranes and wounds are, in fact, prolongations of the capillary vessels already existing before the inflammation; the prolongations are formed at first as fine solid threads, which gradually become thicker, and hollowed so as to admit the passage of bloodvessels; here and there they present spindle-shaped, or triangular enlargements, in which a secondary nucleus, generally single, is produced. In the neighbourhood of the new vessels, as well in false membranes as in the granulations of cutaneous wounds, spindle-shaped and stellate cells occasionally appear, which are generally transformed into elastic fibres. The vessels first formed are but simple capillary tubes, but by subsequent addition of nuclei and fibre cells become converted into vessels of a higher order—arteries and veins. The time within which vessels are formed is variable: in his experiments, Mayer has observed them on the fifth day, but usually on the ninth.

DEGENERATIONS.

Fatty Degenerations.—This interesting and important pathological process has been considered at length in former pages, and we shall at present merely give references to the later investigations. The fatty degeneration of the placenta has been studied by Barnes and Druitt.§ Mettenheimer and Michaelis‖ have made observations on the fatty changes of tubercle and cancer.

Fibroid and Allied Degenerations.—We refer to the valuable critical essays of Dr. Handfield Jones on these changes, in recent numbers of this journal.

Lardaceous or Cholesterine Degeneration.¶—An analysis of H. MECKEL's researches on this curious and interesting form of disease has been given in another place.

* Schmidt's Jahrbucher, No. 6, 1854, p. 273.
† Ibid., p. 274.
‡ Ibid., No. 3. p. 281; No. iv. p. 13, 1854.
§ Medico-Chirurgical Transactions, 1854.
‖ Schmidt's Jahrbucher, No. 6, p. 303, &c.
¶ Ibid., No. 5, p. 190.

Cellulose.—VIRCHOW* continues his researches on the animal substances exhibiting cellulose reactions. He considers it to possess some of the qualities of starch and some of those of cellulose, and that it is probably isomerous with both. Like cellulose, it has the iodine-sulphuric acid reaction; it differs from starch in the incompleteness of the iodine reaction.

CHANGES IN PERMANENT TISSUES AND ORGANS.

Pathological Changes in Cartilage.—NUSCHELER† has published an inaugural thesis on this subject; he recognises the following pathological changes,—fibrous degeneration, softening, ossification, and maceration. We do not find any notice of the important researches of Queckett and Redfern, which have added so much to our knowledge on the structure and diseases of cartilage. He ascribes the fibrous degeneration to a splitting of the hyaline substance, concurrently with which the cells are undergoing dissolution, their contents being set free, and filling the interfibrous space or passing to the surface. The cells either retain their usual form, or may become enlarged, rounded, and filled with endogenous cell-formations; nuclei of different sizes, granular masses and fat molecules are to be seen between the fibres. The fibres are first rendered transparent by acetic acid, and then completely dissolve, while the granular nuclei resist its action. In the process of *softening* the cells undergo a somewhat similar change to that which takes place in the fibrous degeneration, but they may be entirely broken up in parts, and thus cavities, clefts, and deep excavations may be formed, sometimes reaching down to the bone; these spaces may become filled with a fibrous growth.

Two kinds of *ossification* are recognised in cartilage by this author as well as H. Meyer; one a simple impregnation of the cartilage with calcareous salts, but without further change. In the second form round wartlike processes spring from the surface of the cartilage; they appear at first soft and gelatinous, consisting on the surface of normal or fibrous cartilage, and internally of a mass of cartilage cells, in which ossification subsequently takes place; the bodies thus formed may become detached. By *maceration* the author denotes changes occurring in cartilage exposed to the action of pus contained in a joint, resulting either from inflammation of the synovial membrane, or from the opening of an abscess; various degrees of injury to the cartilage may be thus induced, even to complete destruction to the bone. When the cartilage substance is absorbed, it is never replaced by true cartilage, but only by fibrous tissue. The researches of Richet‡ on the state of the parts in the neighbourhood of joints affected with white swelling may be compared with those now quoted.

Lymphatic Glands, Hypertrophy of.—VERNEUIL§ has determined the histological conditions of the lymphatic glands in some cases of simple hypertrophy. The glands (cervical) were regular in form, round, easily cut, presenting a granular surface when torn, and homogeneous throughout, without any traces of septa or lymphatics. Under the microscope, the natural glandular elements were found, only in much increased quantity. By scraping or pressure a reddish-white turbid juice was obtained, miscible with water, which contained numerous transparent, for the most part regular, round, nucleated lymph-corpuscles; here and there granular cells, three or four times as large as the corpuscles, and with a more or less clear nucleus. Fragments of the glandular substance examined with a low power, exhibited granulations similar to the so-called acini; these granulations, when isolated, showed, with higher power, a vesicular, generally transparent envelope, the contents of which were the corpuscles above described.

TUMOURS.

It is unnecessary to dwell on the importance of the minute and accurate investigations which are being now prosecuted by so many observers into the histology

* Virchow's Archiv, vi. 3, 1854.
† Schmidt's Jahrbucher, No 7, p. 20, 1854. ‡ Mém. de l'Acad. de Méd., xvii.
§ Schmidt's Jahrbucher, No. vi. p. 291, 1854.

of tumours. We shall not here discuss the questions of specialism and essentialism in pathological histology. The primary object in this great inquiry is manifestly to determine all the possible histological forms of tumours; it will then remain for the clinical branch of the science to decide, by careful observation, whether any special clinical history attaches to special histological forms. Doubtless too much has been asserted, and too much denied already, and quite prematurely, on both sides of the question; its actual solution is to be obtained only by the careful collation and comparison of the results of both methods of research.

Sarcoma.—This term, embracing the fibro-plastic tumours of Lebert, is still much used without any definite signification. The chief constituent of sarcomatous tumours are the spindle-shaped cells; but Förster's* investigations show that others also occur in various modes of combination. These tumours vary in size, have the general habitus of cancer-masses, but exhibit no abundant juice on section, and there is no vascular fibrous mesh-work. The spindle-shaped cells are not to be confounded with the muscular contractile fibre-cells, which are long, narrow, ribbon-like, only gradually taper to the ends, and have a long narrow nucleus often invisible without the addition of acetic acid. These contractile cells do not exist isolated, but form a fibrous mass, and can be separated only by careful manipulation. The spindle-shaped cells of sarcoma, on the contrary, as well as those elongated fibrous cells which occur in fibroid, carcinomatous, and other growths, and which generally seem only as a transition stage for the production of areolar tissue, are usually broader, their ends rapidly diminish, and the oval nuclei are clearly visible, the contents of the cells and nuclei are somewhat granular; when these walls are united together in masses, the texture has a fibrous appearance. Larger and smaller cells are also formed, some presenting round, oval, or angular contours. The spindle-shaped cells are developed from free nuclei, which are found in every sarcoma; but Förster seems not to admit an endogenous growth, except of nuclei; he has observed cells with 2, 4, 6, 8, 12, and more nuclei, with marks of division to complete separation. Many large mother cells are found filled with nuclei; they finally burst, throwing free the nuclei, which subsequently become developed into cells. In the spindle-shaped, as well as in the mother cells, a fatty metamorphosis sometimes takes place. The tumours are formed of masses of those cells placed end to end, areolar tissue occurs principally in the base, and capillary loops pass through all parts of the growths. With regard to the formation of fibres from fibre-cells, this author has made the following observations. In many places single spindle-shaped cells pass into single fibres, becoming more and more prolonged; the nuclei also become elongated: uniformly they are brought out clearly by acetic acid, while the cells and fibres, on the contrary, become dissolved by this agent. The elongated nuclei themselves seem sometimes to pass into nucleus-fibres. In other parts the fibre-formation seems to take place by the splitting of a cell into many fibrillæ; the nucleus, though elongated, remaining distinct, and being recognisable by its resistance to acetic acid; the nucleus itself sometimes enlarges considerably, a secondary nucleus becomes developed within it; prolongations from it unite with similar ones from other cells, and thus is developed a system of connected (anastomosing) corpuscles, the areolar-tissue corpuscles of Virchow, according to Förster's view.

This author has studied the first development of sarcoma in certain small soft growths, known as epulis on the gums, circumscribed fleshy growths on the conjunctiva, and which are found to consist of the spindle-shaped cells and nuclei embedded in the natural tissues of the parts. The nuclei, which, he says, are entirely analogous to those of the normal tissues, exhibit constantly an endogenous growth by partition. These tumours he considers to be usually of a benignant nature, and only in isolated cases do they form malignant growths. It may be remarked here, that this is a quite correct use of these two much-abused words;

* Schmidt's Jahrbucher, No. 6, p. 291, 1854.

they are here employed to denote clinical features of certain tumours of known anatomical structure, not, as they too often are, as a subterfuge for our ignorance of both the clinical and histological nature of tumours occupying no defined place in our categories. Relapse after extirpation is possible, but secondary extension of the disease is rare. It must be remembered that, under the name of epulis, another totally different form of growth may occur, that described by Robin, consisting of the polynucleated plates, and well named by Paget as Myeloid tumour. Other forms of disease also occur in this situation.

*Papillary Tumours.**—These consist of papillated growths springing from the normal structures. The papillæ consist of simple or compound solid masses of connective tissue, covered with cylinder or plastic epithelium, and containing each a capillary loop. Externally, the tumours present sometimes a strawberry or cauliflower appearance; sometimes they occur as a soft velvety polypi; sometimes in compact masses; sometimes they originate in hypertrophy of normal papillæ; sometimes they are entirely new formations. They occur as warts and condylomata on the skin, and are also found on the mucous membranes, as those of the stomach, rectum, urinary bladder, and vaginal portion of the uterus; also in bones, and in parenchymatous organs. They have been found of considerable size, and in two cases Forster has observed them complicated with carcinoma. The small papillæ will be found to consist of a layer of epithelial cells investing masses of connective tissue, in which, on the addition of acetic acid or caustic soda, a capillary loop becomes visible. These combinations of papillary tumour and cancer constitute, doubtless, the "Zottenkrebs," or papillated cancer. Some of the papillary tumours in which the epithelial element was in excess would appear to correspond with certain of the epitheliomata of Hannover and others.

Enchondroma.—Förster† found in an enchondroma of the finger the texture of the retiform and hyaline cartilage, and many ossified points. In some parts, large cells, presenting the usual reactions, lay so close, that no intercellular substance was found between them, cell-walls and contents forming a homogeneous substance in which the nuclei lay embedded. Some of these nuclei presented numerous endogenous formations, or secondary nuclei; in others, these nuclei again included others, so that a large body was formed with numerous concentric rings. The cells, he believes, are thus formed by an endogenous process. In some parts of a fine section, the cells were fused together, and only the nuclei remained visible; these latter either became elongated, or angular and pointed with prolongations, whereby they anastomosed with each other (similar to the arrangement described by Virchow in the connective tissue corpuscles). In the ossified portions, the nuclei, which had no cell-walls, presented numerous angular prolongations, like the osseous-corpuscles; many of them contained new endogenous nuclei; those nuclei which retained the cell-wall were partly angular, and furnished with prolongations which sometimes pierced the cell-membrane. In other parts, the intercellular substance was opaque, and filled with granular calcareous deposit. The author concludes that the bone-corpuscles are the result of ossification of the nuclei of cartilaginous cells. (Compare these observations with those already cited in 'Annals of Micrology,' No. 22, p. 538.)

Fibroid Tumour.—Förster‡ has found these tumours to consist of a homogeneous or finely-fibrous structure, with large fibrous or stellate elongated bodies (either without a nucleus or with a very indistinct nucleus), unchanged by acetic acid; the fibrous prolongations of adjacent bodies unite here and there. He coincides with the opinion of Virchow that the corpuscles are hollow, and that the prolongations form a system of communicating tubes for the conveyance of nutriment.

* Förster, loc. cit.

† Schmidt's Jahrbucher, No. 6, p. 293.

‡ Ibid.

Structure of Ranula.—C. O. WEBER* has examined the structure of this affection in two cases. The microscopic examination showed the wall of the sac, which was covered with the mucous membrane of the mouth, to consist of a pretty strong connective tissue. The inner secreting surface of the tumour was vascular, and presented an investment of a single layer of polygonal epithelial cells. The fluid contents, mixed with a little blood, were thick, greenish, opalescent, and showed under the microscope epithelial elements, and so-called mucous corpuscles; on addition of acetic acid, the fluid quickly coagulated, but did not lose its transparency; chloride of iron produced no red colour. The results of the examination of the second case were nearly similar.

Simple Dermoid Tumour of the Eye.—VIRCHOW† gives a notice of this form of growth more fully investigated by Ryba. It presents, more or less, the complete structure of the cutis; is apparently of congenital origin; and, in the course of later life, becomes further developed. The formation of hairs is not constant. The seat of these tumours may be partly on the sclerotica, partly on the cornea.

Epithelial Cancer.—Under this head FÖRSTER‡ considers formations, some of which, at least, we should be disposed to place with epithelium, in accordance with a more strict pathological classification. He says that it is characterized by the *tesselated* epithelial shape of its cells, by its slow course, the generally more favourable result which attends operations for its removal, and the greater rarity of relapse. These characters agree with those assigned to the purely epithelial growths; but Förster states it as his opinion that the formation in question is entirely independent, as to its origin, from the normal epithelium, and that its cells have the same modes of genesis as those of ordinary carcinoma. He describes them as found under three groups—those possessing large nuclei, those similar to the cells of the mucous membrane of the mouth, and, thirdly, cells like those which occur in the encysted tumours of the skin, especially those of the so-called cholesteatoma; there are several transitional grades between these forms; we also find horny or atrophic cells, like those of the epidermis. The majority of the cells are, however, large and flat, uniform in outline or split, angular and multiform; their outline is sharp, their contents homogeneous or granular, and they contain from 1 to 2 nuclei of 1-300^{m}—1-200^{m} in diameter. They lie usually joined together at the angles, and when viewed from the surface, appear like an epithelial membrane; but when seen from the edges they present a fibrous appearance. It is needless to point out how most of these characters agree with those assigned to epithelioma. Between the cell-masses are found the "nest"-like bodies, with a consecutive arrangement of compressed cells, like the corpora amylacea, the cells around being so disposed as to present the aspect of a fibrous stroma. A true stroma of connective tissue, and with capillaries passing through it, is often present.

Certain metamorphoses take place in the elements of this epithelial formation, or so-called—and, as we hold, wrongly so-called—epithelial cancer. 1. *Shrinking and contraction.* The cells become contracted and small, like those of the epidermis, forming solid plates in which no trace of a nucleus remains visible, or is only brought to light after the action of acetic acid. Sometimes the cell-contents become altogether changed to a fatty matter; and then the scales, with a shining fatty aspect, and closely pressed together, present the polyhedral network known as cholesteatoma. In the advanced condition of horny change, the solid scales break up gradually into small fragments, and in the end become a molecular powder; with this process a fatty change may be combined, and then crystals of cholesterine, and occasional crystals of calcareous salts, will be found. The *fatty metamorphosis* has been but seldom observed by Förster; it occurs chiefly in degenerated and softened lymphatic glands. *Colloid metamorphosis* appears to have been frequently noticed, and in two forms: in free nuclei, which enlarge and form

* Archiv für Path. Anat., Band vi. No. 4, p. 511. † Ibid., p. 555.
‡ Schmidt's Jahrbucher, loc. cit., p. 162.

shining, opaque, spherical vesicles; these bodies sometimes present a secondary nucleus; the altered nuclei sometimes form the centre of the "nests" above described. Bodies with concentric rings are also produced in this change, but the vesicles never become so large in epithelial as in alveolar cancer; but, as in the latter, the colloid masses are often set free by the bursting of the cells. The process may be thus traced throughout: the nuclei gradually increase in size; their contents, at first dark and granular, become clear and shining, being changed to a colloid mass; the contents of the cells are pressed against the cell-wall; if a second nucleus is produced, the same process is gone through; sometimes two colloid vesicles are developed in a doubly-nucleated cell. The colloid vesicles may become very large and then burst, setting free their contents; fatty granules are produced within them, or new nuclei are formed which, in a similar manner, expand and form new cells. This metamorphosis takes place, but to a small extent, in some masses of epithelial formations; at other times it takes place to such a degree, that the structure has the appearance of hyaline cartilage, the cells lying close together, and the colloid vesicles appearing like shining cartilage-cells. Occasionally, this author (Forster) has found growths in which the cells fused together formed a homogeneous and finely-granular intercellular substance in which the nuclei, having undergone the colloid change, and containing endogenous secondary nuclei, lay embedded like cartilage-cells. The albuminous metamorphosis is most like the colloid, similar processes of expansion and endogenous nuclean formation being observable in both.

Development of Epithelial Cancer.—FÖRSTER considers the growth to originate in the nuclei imbedded between the fibres of the subcutaneous areolar tissue, or in those of the cutis; whether the nuclei are produced by endogenous growth, or by partition of the nuclei of the areolar tissue, is undetermined. Förster concludes, from his observations, that epithelial cancer is a variety of cancer in general. We have already, on more than one occasion, expressed our views as to the existence of an epithelial disease capable of assuming the form of tumour, and often very malignant in its nature, but which is not cancer. That there is a true cancer of the skin and mucous membranes must be admitted, and we believe the affections are very often confounded; no doubt also they may sometimes exist in combination. But if they be not the same in structure, and if there be but even slight differences in their clinical results, we hold it to be inconsistent with the strict requirements of pathological science, to confound the two diseases under one convenient name, which saves the trouble of exercising such rigid diagnostic acumen. Cancer may or may not be a special pathological entity, may or may not be constant as a mode or type of diseased action; but this, at least, we may say about it, that its phenomena are distinct from those of other diseases, and it is unphilosophic to make superficial resemblances, such as exist in the case of cancer and epithelial disease, the grounds for confounding the two under one term, however convenient such a proceeding may be.

Papillary Epithelial Cancer.—SCHUH* recognises three forms of this disease; flat cancer, granular epithelial cancer, and epithelial cancer which presents a simple surface, or branched cauliflower mass, invested with a layer of plaster-epithelium. When occurring in the sexual organs, the masses are much branched, long, papilliform, and he considers them entitled to the terms epithelial papillary cancer, or papillary epithelial cancer. The remarks we have made in reference to the views of Förster apply with equal force to the statements of Schuh, who, while making strictures on the want of logical accuracy in other investigators, falls into the common mistake of using the terms "cancer" and "malignant" as convertible. He gives a very good description, however, of the growth and structure of the epithelial disease which affects the penis. On section he has observed in the diseased mass three substances clearly distinguishable; a white, thick, almost

* Zeitschrift der K. K. Gesell. zu Wien, p. 272, 1854.

callous mass into which the corpora cavernosa and surrounding areolar tissue become changed, a small one-line thick, whitish yellow, or reddish layer, and an outer cauliflower-like growth. This last consists of a thick papillary mass, one to six lines deep; the papillæ are of various length, shape, and thickness, some cylindrical, some club-shaped, some conical, standing parallel or springing out in bushy masses from a single point, partly single and independent, partly branched and of cock's-comb appearance; some united, so as to form loops or serpentine shapes. On the surface is found a layer of large polygonal cells, with a single well-marked nucleus, also occasionally long and epithelial cells. The deepest layer is a white fibrous mass, many lines thick, investing the corpora cavernosa; the whole of these structures may be replaced by the white fibrous tissues, in extreme cases, which also may involve the prepuce. Under the microscope this callous substance appears obscurely fibrous, and contains many elastic fibres, the remains of the normal tissue, as Förster thinks; besides which there may be seen everywhere epithelial cells.

Alveolar Cancer.—Förster thinks the origin of this formation is to be traced to the masses of nuclei which are found between the bundles of fibres; they present the usual reaction, are round or oval, and in all respects resemble the connective tissue nuclei; they are somewhat contracted by acetic acid, but their outlines become more distinct; the larger ones have usually granular contents, and but one nucleolus, which itself is not constant. These nuclei are usually single, but show traces of subdivision, and it is undetermined whether they originate in the primary blastema, or by subdivisions of the nuclei of the normal connective tissue. No cell-wall is observed to form about them, but they increase gradually by addition to their contents. Much larger nuclei are found, $\frac{1}{180}'''$ to $\frac{1}{80}'''$ in diameter, the contents of which are entirely homogeneous, their molecular contents having been removed; from them are gradually formed the *colloid-containing bodies*, with fine delicate walls and shining homogeneous contents, which shrink up on the addition of acetic acid, and often become split into irregular masses, which sometimes escape by bursting of the wall of the vesicle. By means of such nucleus-vesicles the surrounding fibrous tissue becomes pressed asunder, and thus are formed the first colloid-containing network spaces, which, by subsequent disease, have become visible to the eye as such, with the characteristic gelatinous appearance. These vesicles burst without undergoing further development, their contents becoming free, but only rarely forming a homogeneous mass; more usually a portion of the wall remains, giving the half-moon form. The vesicles sometimes reach a very large size, $\frac{1}{45}'''$, without bursting, and also occasionally present endogenous formations, the included nuclei passing through the same stages as the primitive ones, or sometimes escaping and then undergoing changes; sometimes the endogenous formation proceeds to the extent of forming numerous connective layers of vesicular walls, producing the appearance of a stout vesicle; these layers become more visible by the action of acetic acid. Very complex bodies are often thus formed. The stroma in which these bodies are contained usually consists of the thickened surrounding areolar tissue; sometimes it originates in the contractile fibre cells of the muscular coat, which however soon disappear, only the connective tissue remaining, the areolar tissue meshes become gradually extended, so that in a single space a heap of the colloid vesicles will be found; in other parts, however, a very fine areolar network surrounds each of the single vesicles. With the increase in number and size of the vesicles, the connective tissue also continues to grow, and numerous fibre cells are formed in its meshes. In the opinion of Förster, the growth of the alveolar cancer is completely analogous to that of carcinoma; an alveolar fibrous network or stroma surrounds transitory nuclei, from which are developed not nucleated cells, but bodies as above described, filled with colloid matter. Sometimes the alveoli of the colloid mass may be recognised on section by the naked eye, large cyst-like spaces being formed; this takes place by the expansion of some contiguous areolar spaces, and the disappearance of the fine

tissue investing the included vesicles, so that finally a closed cavity is formed, with fibrous walls, and filled with colloid contents; the inner wall of many of the cysts becomes gradually smooth and homogeneous, and finally become invested with a single layer of plastic-epithelium; many large cysts are formed by the fusion of smaller ones. Forster says he has easily demonstrated the transition from simple areolar tissue to the cyst formation; he differs in this view from Rokitansky, according to whom, one of the nucleated vesicles constitutes the primitive cyst, the connective tissue with its vessels and epithelial layer being subsequently formed around it; a new generation of nuclei is developed in the contents of the original vesicle, and thus possibly a large cyst becomes formed. Concretions are occasionally found within the colloid vesicles, varying in size and number from a few small calcareous granules to masses which completely fill them; fatty metamorphosis of the contents may likewise take place. The special primary seat of alveolar cancer appears to be in the mucous membrane of the stomach, and the intestines, and the peritoneum, especially in the neighbourhood of the rectum; but it is also found as a primary deposit in other organs, as the mammæ, the kidneys, and the liver. The secondary propagation of alveolar cancer appears somewhat less frequent than that of carcinoma; the modes of propagation are, however, similar in both; the neighbouring lymphatic glands are most frequently affected. The colloid metamorphosis of the nucleus and cell-contents in alveolar cancer is, according to Forster, not peculiar to this form of growth, as he says that its occurrence is not infrequent in many physiological and pathological tissues, without, however, the production of alveolar cancer; he states that he has seen this metamorphosis in nuclei and cells of glands, in the kidneys, liver, prostate, and the glands, *en grappe*, of the mucous membranes. This is a most important observation in connexion with the difficult questions of special or non-special pathological histological elements, and is worthy of much careful investigation. Forster describes this process as either commencing in the change of the nucleus into a vesicle filled with shining contents, which splits up and shrinks on the addition of acetic acid; or the change may proceed at the same time in the nucleus and cell-contents, so that finally both pass into each other. The colloid vesicles thus formed subsequently burst, and their contents swim about in the gland secretion, in which they may be recognised as irregular shining masses. He has most frequently seen this process in the kidneys, next in the prostate, where the nuclei appear to form the basis for the concentric deposits known as prostatic concretions. This metamorphosis is very frequent in the thyroid gland, constituting the so-called colloid stroma; the small cells which invest the normal spaces imbedded in the highly vascular connective struma of this gland are, by the change of their contents, and that of their nuclei, transformed into large shining spheres, which either discharge their contents or present within an endogenous formation of similar colloid bodies, of various number and size. By the accumulation of these colloid masses, the normal spaces or vesicles of the gland become much distended, and enlarged, their cellular investment disappears, and large spaces or cysts filled with colloid are then formed. In pathological formations this colloid transformation happens most frequently in epithelial cancer, commencing either in the change of the nucleus, or in that of the cell-contents, as elsewhere, and often proceeding to endogenous formations; the colloid nuclei and cells often form the central basis of the so-called concentric globes or masses of epithelial cancer. Colloid metamorphosis occurs but rarely in carcinoma or sarcoma. Alveolar cancer sometimes much resembles the compound cystoid-tumours; in such form it may be found in the ovary, originating probably in the Graafian vesicles, and in the mammary gland, in which it is formed by changes in single acini, or in expanded milk ducts.

Formation and Extension of Cancer-cells in the neighbourhood of Cancer.— SCHROEDER VAN DER KOLK* has made some observations on this subject, which we shall give at length in an early number.

* Schmidt's Jahrbucher, No. 5, p. 164, 1854.

Cavernous Blood-tumours—Teleangiektasis of Authors.—ROKITANSKY* continues his researches on these tumours, the chief seat of which is in the liver, then in the subcutaneous connective tissue, and the cutis, on the face in the substance of the lips, on the trunk, and the limbs. Rokitansky has also seen cases of cavernous tumours in the bones of the cranium, on the dura mater and pia mater. He has seen two cases in which these tumours on the temples admitted of extirpation. The tumours are always in connexion with several smaller or larger veins, so that they are either seated on them, or the veins are involved in the mass of the tumour. He has seen one on a branch of the saphena, near the groin; also on the superior longitudinal sinus. Those in the liver are generally seated on the branches of the vena porta. In the extremities, as remarked by Schuh, they are placed on the fasciæ, sinews, or periosteum. There is generally but one tumour in each individual case; but several instances of multiple tumours have been observed. This form of tumour consists, as may be seen on a full section, or better, on pressing out the blood and examining the structures under water, of a meshwork or loculated structure, composed of lamellæ and bands of different strength and thickness; in many cases a double network may be seen. The spongy structure thus formed, contained in its spaces, fluid venous blood, generally in quantity sufficient to fill and expand the tumour, so that it projects from the surface of the organ in which it is seated, as is the case in the liver. In many instances, the blood in the tumour is coagulated; there are often found here and there in the spaces, round, ossified bodies of concentric structure, resembling the so-called vein-stones. The blood may be entirely evacuated by a cross section, so that it is evident the spaces communicate. The bands and network are sometimes of hyaline structure, sometimes lightly striated, here and there slightly corded, or they may consist of a completely fibrous tissue, in which are found oblong nuclei, spindle-shaped caudate cells. He has never noticed organic muscular fibres; elastic fibres are rarely met with; and it is only in the earlier condition of the tumour that an epithelial investment of the spaces is observed. Though he has followed the development of the cavernous tumours from their primary origin, yet he regards it as similar to that of other network tissues, including the stroma of cancer; a hyaline loculated mass is developed, which produces cells in its interior, or a naked cell-mass may be formed, in which loculi are afterwards produced by partial absorption. The hyaline masses sometimes become elongated, and thus form secondary tubes, some of which are branched, and contain in their interior nuclei and nucleated cells; and thus is formed a tissue which corresponds with that of the papillary cancer, everywhere invested with the contents of network spaces—viz., blood. Within these are also formed other structures, which are of importance, as being the basis of a vascular growth of a special kind, which is to be considered afterwards. Rokitansky regards the cavernous tumour as a new formation; the communication with the veins he supposes to take place subsequent to the first origin of the tumour, and in the following manner. The meshwork bores its way through the veins, the inner surface of which, when in connexion with the cavernous structure, will usually be found rough and villous, and covered with a felt-like mass, which, on further examination, may be shown to be the tissue of the cavernous growth, which has made its way into the vessel. The anastomosis of the cavernous spaces, with one or several veins, and then being filled with blood, must be regarded as a secondary occurrence, which has been clearly established by the observations made on small tumours which contained no blood, not having as yet opened into the sources of their blood-contents.

Cavernous Tumour of the Brain.—LUSCHKA† has met with an instance of cavernous tumour seated in the anterior lobe of the left hemisphere of the brain in a case of suicide, which presented no other abnormal conditions. His views with regard to the pathology of the disease, its structure and mode of formation,

* Zeitschrift der Gesell. der Aertze zu Wien, p. 256, 1854.
† Virchow's Archiv, Band vi. Heft iv. p. 458, 1854.

are almost identical with those of Rokitansky. The tumour, of the size and form of a pigeon's egg, was removed with great facility from its seat, and had no apparent vascular connexions. The contents of most of the cavernous spaces was blood, which presented corpuscles of natural form and size; some of the cavities contained crystals of cholesterine, fat-granule cells or corpuscles, and fine molecular calcareous granules. Luschka likewise remarks the similarity of the cavernous tissue to cancer stroma, as noticed by Rokitansky. The bands of the fibrous meshwork present various appearances, some fine and delicate, others strong; the fibres are of different diameters, from that of the finest connective-tissue fibrillæ to 0·006^{mm} in breadth. In the thicker bands, round or oblong nuclei were visible, many of them appeared hollow and tubular, the central cavity being separated by a sharp line from the fibrous wall. It was several times noted that the cavity of the hollow bands communicated with that of some of the little club-like masses which were attached by a pedicle to parts of the meshwork. These little pyriform bodies were scarcely 0·1^{mm} in length; they were attached by a longer or shorter stem or pedicle to the fibrous tissue, and played by their free extremities in the cavities of the tumour. Many of these bodies were hollow, and, as before remarked, communicated frequently with the tube-like bands. Rokitansky has also described this system of tube-like bands with structureless walls, with simple and sometimes double contour, and containing granules, nuclei, and cells.

In an able memoir* on cavernous tumours, characterized by his usual profound and extensive research, VIRCHOW differs in several most essential particulars from the views of Rokitansky and the other observers we have cited. He has found the trabecular bands to consist almost entirely of long fibre-cells, probably smooth muscular fibres; they are long, narrow, and clear, and present an oblong, narrow nucleus. They may be easily isolated after treatment, with a 20 per cent. solution of nitric acid. On the addition of acetic acid, the connective-tissue becomes clear, and exhibits numerous oblong nuclei, mostly in regular rows. He concludes that the muscular fibres are arranged in rings around the cavernous spaces. Virchow's views, as to the relation of the tumours to the pre-existing vessels, differ entirely from those of Rokitansky. He believes that the cavernous tumours in the liver are developed, not between, but in the place of the elements of this organ, so that a certain group of acini becomes replaced by them. The whole vascular system of the part gradually becomes converted into a cavernous ecstasis, which stands in direct connexion with the veins and arteries around; without that a special capillary apparatus is demonstrable. The process begins with an increase of the connective-tissue of the liver, which is quickly followed by the disappearance of the secretory part of the gland. In the young connective-tissue, at first rich in nuclei, the vessels enlarge, while their walls become thickened, and unite with the surrounding tissue. There is also a new formation of smooth muscular fibres. He believes the cavernous structure to have considerable analogy with the placenta. A remarkable passage is cited from Cruveilhier, in which it appears the similarity of the stroma of the then so-called varicose formations, and that of cancer, was long since (1835) fully pointed out, and which Rokitansky must have overlooked. Virchow has seen only one example of cavernous tumour of the external parts.

Vascular Tumour.—ROKITANSKY† has met with two instances of a peculiar form of tumour, one from the eyelid of a child half-a-year old, the other from the integument of the forearm. They were remarkable for a gland-like lobular structure, with an interlobular connective-tissue. On microscopic examination, in whatever direction a section was made, a trabecular structure was presented, and the growths seemed formed of an aggregate of blood-conducting tubes, which ran in a determinate direction, lying parallel to each other. On cross section, the

* Virchow's Archiv, Band vi. p. 4, 525.

† Zeitschrift der Gesell. der Aertze zu Wien, p. 267; 1854.

circular mouths of these vessels were shown varying in diameter from 30·1000mm to 75·1000mm. On first view, the appearances on section showed the greatest similarity to a section of the cortical substance of the kidney. He considers the tumours to be an example of new formation of vessels. The tubes present hyaline structureless outer and inner walls, which appear independent of each other; and between them are found oblong nuclei and caudate cells. The tubes give off branches, and sometimes end in cœcal branches. The mode of development of these vessels is not yet sufficiently determined; but Rokitansky believes it to be connected with the new formation of blood. He believes the tumours under consideration to be identical with those described by Schuh, as alveolar blood or vascular spongy tumour. They are not to be confounded with teleangicktasis, with which they have nothing in common; they are rather to be designated as a fasciculated vascular new formation.

Cholera Typhoid—Renal Affection.—In a memoir of some extent on this subject, Dr. LUDWIG MEYER* claims priority for the observations of his friend, the late and much to be lamented Reinhardt, over those of Frerichs. This question, however, we shall not enter into; it will suffice to state, that Reinhardt's papers contain important results of original investigations on the affections of the kidney, including those manifested in the cholera typhoid.

Meyer investigates the relation which the degree and development of the affection of the kidneys have to the secondary diseases of cholera, which it is often found to accompany. The urine examined during the stage of reaction in several cases was of a dark-red colour, albuminous, and exhibited, under the microscope, a large quantity of fibrine-cylinders, with blood-corpuscles, and renal epithelium; the latter already showing a partial fatty degeneration. Some of the cylinders were tortuous, others of remarkable length, and some few exhibited branchings. Many kidneys in various stages of the disease were examined. Meyer has obtained the best preparations by boiling in dilute acetic acid, their sections subsequently showing the structure very clearly, and particularly the Malpighian bodies. He has been able to control his own observations by comparison with those of Reinhardt. Meyer has seen no case of cholera, however sudden and brief, in which the kidneys did not show some alteration. In the case of a strong labourer, who died after nine hours' illness, the kidneys exhibited the peculiar opaque condition of the first stage, appearing as if saturated with albumen; microscopic examination showed the changes in the renal epithelium described by Reinhardt—namely, infiltration of dark protein-like molecules, soluble in acetic acid, and strong adherence together of the cells, so that they could be pressed out in the form of cylindrical tubes. Another characteristic is the very early occurrence of fatty degeneration, and the irregular and diffuse manner in which it is presented, the smallest sections never exhibiting throughout a uniform change. This important memoir must be studied at length; we merely note the points of histological interest.

* Virchow's Archiv, Band vi. Heft iv. p. 471.

QUARTERLY REPORT ON PATHOLOGY AND MEDICINE.

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I. The Diseases of the Blood.

1. *The Occurrence of Pigment in the Blood.* By Dr. J. Planer. (Wien Zeitschrift, Feb., 1854.)
2. *On the Oxidation of Ammonia in the Human Body.* By H. Bence Jones, M.D., F.R.S. (Proceedings of the Royal Society. Vol. vii. No. 4.)

1. The occurrence of a large amount of pigment granules in the blood has been long known. Meckel, Virchow, and Heschl have described it as frequently happening after intermittent fevers. In many of these cases the pigment appears to cause no injury to the system, but in other instances, and Dr. Planer describes many of these, very sudden death ensued, with symptoms that led to the diagnosis of a disease of the brain or of typhus. In other cases again, the collection of pigment was associated with dropsy and albuminuria, but whether it had any intimate connexion with these symptoms was doubtful.

Dr. Planer relates all the cases of pigment in the blood which have been discovered in the dead house at Vienna during the last two years. He refers first to the—

(1.) *Cases in which there were Cerebral Symptoms.*—The pigment in the blood was found in the state of black, or more uncommonly of brown yellow, brown or (very rarely) red granules, many of which were united together by a clear hyaline substance, which was soluble in acids and alkalies. Meckel observed pigment cells very rarely; Virchow more frequently; Planer never. Planer also never saw in the pigment masses anything like a nucleus. Besides these masses, the aggregation of the pigment grains sometimes forms black or brown flakes of the most variable form; these flakes are sometimes evidently constituted by a hyaline substance, in which black pigment is embedded, and, in two cases, in the blood from the right ventricle. Planer found two hæmatoidin crystals adhering to this clear substance.

The relative number of the pigment masses, as compared to the blood globules, was not determined. In some cases the capillaries seemed almost choked up with them. Planer did not find that the colourless corpuscles of the blood were more numerous. The pigment was always found in the blood of the heart; it was not more common in the blood of the portal or splenic vein than elsewhere. The pigment masses were little affected by reagents. Meckel found them decolorized by chlorine, but Planer does not confirm this.

In addition to being in the blood, pigment was found in these cases in the organs, especially in the spleen, and it was found in this organ even in cases in which other organs and the blood contained very little of it. The special seat of the pigment in the spleen was not determined; its form and general characters were exactly the same as in the blood. Virchow and Meckel have found the pigment in cells in the spleen, but Planer found only the agglomeration of the pigment granules by the hyaline substance.

In the liver the pigment granules were often very numerous. They were found to be sometimes in the vessels, but it could not be determined whether they were wholly thus placed, or whether some part of them lay outside the vessels between the cells. The livers thus affected were of normal size; the cells were normal, or contained more fat than usual, and also brown granules of bile-pigment, which was, however, easily distinguished by its appearance, as well as by its chemical reactions from the pigment in the blood.

The cerebral substance was often affected with this pigment change, and in this case it was certain that the pigment was in the vessels; in some cases the flakes

already referred to as seen in the blood in the heart and large vessels were, in the cerebral capillaries, of such size that it seemed impossible they could pass. In fact, Planer conjectures that the extreme abundance of pigment granules in the cerebral vessels must have been caused by the fact that they could not pass through the cerebral capillaries, which (especially in the grey substance) are the finest in the body (Kölliker).

Meckel describes a case which occurred in Vienna, in which there were in the grey substance numerous punctiform hæmorrhages produced by blocking of vessels through pigment, and since this time several cases of the same kind have been seen by Planer.

Besides the spleen, liver, and brain, the kidneys were found to contain pigment, both in the vessels of the cortical substance, and of the Malpighian capsules. Some pigment was also found external to the vessels, and perhaps was the residuum of punctiform hæmorrhages, but no fresh punctiform hæmorrhages, such as occurred in the brain, were ever seen in the kidneys.

The pigment was found in the pulmonary vessels in very variable quantity. In the vessels of the other organs of the body its quantity was unimportant, except in the lymphatic glands, where it was sometimes abundant.

After making these general remarks, Dr. Planer relates 19 cases on which they are based, and refers also to 10 other cases whose histories he does not give. The cases are too shortly reported, but it is evident that they belong to a class not seen, or but very rarely seen, in this country. In 12 of the 19 cases, the patients were comatose when brought to the hospital, and in most of them the coma had set in suddenly sometimes with, and sometimes without, previous symptoms of malaise or fever. In the 7 other cases, there were symptoms of intermittent fever, and then gradual fatal stupor came on. In several of the cases there was paralysis as well as coma.

In the whole 29 cases referred to in this series, there were 14 in which the pigment was in such quantity in the cerebral vessels as to give the grey substance a remarkably dark slate grey aspect; in 8 of these cases there were numerous little hæmorrhages. In the other cases the pigment was in less quantity in the cerebral vessels, but still was always found there.

(2.) *Cases of Albuminuria and Dropsy with Pigment in the Blood.*—19 such cases were discovered in the dead house; in 12 there had been previous intermittent fever, or this existed at the time; in the others it could not be learnt whether there had been previous ague.

The appearances of the pigment in the blood and organs were the same as in the former series, except that the cerebral vessels contained little of it, and the kidneys a great deal. In spite of the albuminuria and dropsy, the kidneys were normal, except as far as the pigment was concerned, and in no case could it be safely said that there was Bright's disease.

(3.) *Cases in which there was Pigment in the Blood and Organs without appearance of injury to the health.*—26 cases are related in which death occurred from the following causes: phthisis, 4; typhus, 2; pneumonia, 6; arthritis and pericarditis, 1; peritonitis, 1; pyæmia after operation, 1; puerperal affections, 3; gangrene of the leg, 2; granular liver, 1; marasmus senilis, 4; calculous nephritis, 1. In all these cases the liver and spleen were as pigmentary as in the other series of cases; in the blood the pigment was in less amount, and it was scarcely found in other organs; in only 1 of these 26 cases was the grey substance of the brain darkly coloured through it.

(4.) *Origin of this Disease.*—Dr. Planer believes that the development of the pigment is closely connected with the occurrence of intermittent fever, although he admits that in several of the cases there was no authentic evidence of previous ague. He observes that he has in many cases of ague-cachexia got a little blood during life by pricking the finger, and has been astonished at the number of pigment granules and flakes exactly resembling those found in the dead bodies already referred to.

Planer remarks finally, that in spite of the number of cases he has seen, this pathological condition is very little understood, because observations on living subjects are yet wanting. It is certain, however, that he has opened up a new and most important inquiry, which promises to give us some new insight into malarious diseases.

2. In our Chemical Report, which will be inserted in our next number, we shall have to notice the controversy which has arisen from Dr. Bence Jones' statement, that ammonia is oxidized and converted into nitrous acid in the blood, and can be then detected in the urine; and Dr. Jaffe's counter statement, that Dr. Jones has mistaken sulphurous for nitrous acid. The paper before us contains additional experiments by Dr. Bence Jones, which certainly do appear to us conclusive as to the accuracy of his original assertion. We defer, however, a critical examination for the present.

II. The Acute Specific Diseases.

1. *On the Pathology of Yellow Fever.* By Dr. Bache. (Amer. Journ. of Med. Science, July, 1854.)
2. *On Black Vomit.* By Dr. La Roche. (Ibid., Jan. and April.)

1. Dr. Bache relates briefly fourteen post-mortem examinations. The most novel and interesting point is, that in all the cases the liver, on examination with the microscope, was found to be highly fatty. "The secreting cells were pale, ill-defined, and less granular, than when in the normal state. In the cells, with few exceptions, no nucleus could be detected, but its place was supplied by a single oil globule. This was observed even in those cases in which the granular part of the cells was not so full of oil as in some others. Generally, the cells were so studded with oil globules, as to give one the idea of looking at a number of these latter, which had by chance become agglomerated or entangled by granulation." The same appearances were found by other observers. The fatty nature of these globules does not appear to have been proved by chemical reaction. A tabular view is given of the morbid appearances, similar to that published in Dr. Blair's work on the yellow fever of British Guiana. For this we refer to the paper.

2. Dr. La Roche has published a most elaborate paper on the black vomit. He has brought together the opinions and statements of a host of writers on the subject, and has thus made a most important addition to the literature of yellow fever. To attempt to analyse the paper would be impossible, and is indeed so far unnecessary, as it is only a compilation, though a most useful one; we must therefore content ourselves with directing attention to it. Very good plates are given of the microscopical appearances.

III. Diseases of the Organs of Locomotion.

1. *On the Hypertrophy of Muscles.* By Dr. Ludwig Hepp. (Henle's Zeitschrift für Rat. Med. Band iv. Heft 2. pp. 257.)

By an accurate measurement of healthy and hypertrophied muscular fibres, Dr. Hepp has discovered that in the latter case, the enlargement of the primitive fibres is sufficient to account for the increase in size of the muscle, without the hypothesis that the fibres are increased in numbers. The relation of the diameter of the healthy to the hypertrophied fibres was as follows:—

In the heart as 1 to 4.
In the bladder as 1 to 2.

Dr. Hepp has also made out, that the increase in size in much exercised muscles, as, for example, of the biceps in a strong man as compared with a woman, is due also to increase in the diameter of the fibres, and not to augmentation of their number.

IV. Diseases of the Thoracic Organs.

1. *On Bronchitis Crouposa.* By Dr. Thierfelder. (Archiv für Phys. Heilk. 1854. Heft 2. pp. 206.)
2. *On Tubercle.* By M. Mandl. (Archives Gén. de Méd. Mars—Avril.)
3. *On Pathological Exudations in the Pleural and Pericardiac Cavities.* By Dr. Grohe. (Würzburg Verhandlungen. Band iv. Heft 2. pp. 147.)
4. *Lumbrici in the left Pleura.* By Professor Luschka. (Archiv für Pathol. Anat. Band vi. Heft 3. pp. 410.)
5. *On a Double Self-adjusting Stethoscope.* By Dr. Bowditch. (Amer. Journ. of Med. Sci., July. pp. 85.)

1. The term bronchitis crouposa is used by Dr. Thierfelder to denote the disease in which fibrinous casts of the bronchial tubes are coughed up. He relates a case at some length, describes the microscopic characters of the coagula, and discusses the diagnostic signs. In all these points, however, there is nothing new. He then refers to all the cases he has been able to find in medical records during 120 years. The following conclusions are then given. 1. The croupous inflammation, which affects a great extent of the bronchial ramifications, without laryngo-tracheal croup, is either an apyretic and very chronic disease, or it is an acute febrile affection, and is then combined with other inflammatory diseases. 2. It is a very rare disease; in the literature of the last 120 years, only five cases of the chronic, and thirteen of the acute cases are recorded. [This is surely much below the real amount.—*Rev.*] One case now added makes nineteen. Of these nineteen, sixteen have been observed in England, France, and Germany, in the last 30 years. Eight of these occurred in one month in Paris, in the course of an influenza epidemic. The disease is much more common in the cold months. 3. The individuals who were attacked were between 12 and 72 years of age, and almost two-thirds were males. No particular bodily conformation could be discovered. 4. The coagulated exudation fills the bronchial tubes, from the capillary branches to tubes of the fourth, third, even the first order; it lies, without adhering, on the deep red mucous membrane. It shows all the physical characters of the croupous exudation, and appears to be formed by successive pouring out of the material. 5. The auscultatory signs give no decided indications, and the diagnosis must be drawn from the expectoration. In a third of the acute cases, however, there is no expectoration. 6. The severity of the functional symptoms appears to be proportioned, not to the extent, but to the acuteness, of the local symptoms. The apyretic cases run on without marked disturbance of the nutrition and general health; the acute cases are mostly fatal (eleven among thirteen). 7. The pure antiphlogistic treatment is of little use in the chronic cases; large doses of muriate of ammonia, calomel, or iodide of potassium, are the best treatment; in acute cases, calomel.

2. M. Mandl has published two interesting papers on the microscopic examination of tubercle, in which he enters pretty fully into the literature of the subject. He denies altogether that tubercle presents any specific morphologic elements. He states:—1. The tuberculous substance is an amorphous matter strewed with fatty molecules; it is finely granular at first, then diffluent. It infiltrates the elements of tissues, and solidifies in the interstices. The fragments of this amorphous substance, presenting neither determinate form nor size, are analogous to those of all other amorphous exudations. There are no special tubercle-

globules or corpuscles; there are no characteristic elements. 2. The tubercular substance, being an amorphous matter, cannot increase and develop. Tubercles grow only by juxtaposition—i.e., by fresh exudations. This is a proof the more that the progress of the disease is dependent on an incessantly active cause, which cause must be got rid of, if we would root out the tuberculisation. 3. Softening of tubercle is due to a fatty degeneration, which can declare itself before products of inflammation, such as pus and "inflammatory globules," show themselves. 4. This degeneration is a certain proof that tubercle cannot organize itself, as fatty degeneration occurs only in tissues, the nutrition of which is suspended. 5. By means of the fatty degeneration and the products of inflammation, which are joined to it at a later period, tubercle is completely eliminated. 6. If one is permitted to draw a therapeutical inference from these facts, it is, that attention should be directed, first to the cause, and secondly to the modifications which the tubercle undergoes—i.e., the natural course of the disease.

3. Dr. Grohe has investigated the chemical characters of some exudations in the pleura and pericardium. From very numerous observations, conducted on patients with tuberculosis, pneumonia, pleuropneumonia, and with organic heart affections, he has found that *urea* is a constant ingredient of great effusions into the pericardium and pleuræ,—the quantity of the urea was not, however, great either in these effused fluids or in the blood. In some cases of ascites, on the contrary, no urea could be found. The author attributes this to the different physical conditions under which peritoneal effusions are placed, from pleural and pericardiac, on account of the immense absorbing surface of the intestines which is bathed in the peritoneal effusion.

Sugar was present in the effusions only in two cases: one was an epileptic, with both pericardiac and pleural effusions, but of whose history nothing was known. The second case was in a woman, who was admitted into the hospital after seventeen days' illness, in a state of high fever and delirium, and who died two days after. On postmortem examination there was found chronic pneumonia, with formation of abscesses, double pleurisy, pericardiac effusion, chronic cheesy infiltration of the cervical and pelvic lymphatic glands, and parenchymatous catarrhal parotitis. The pericardial fluid (but not, apparently, the pleural) contained a large quantity of sugar.

The inorganic constituents do not appear to have been determined, nor is the total number of analyses mentioned. It is merely said that they were numerous.

4. Lumbrici have been found in many parts of the abdomen, and even free in the peritoneal sac; but Professor Luschka communicates an extraordinary case, in which, through the intermediate process of a retro-peritoneal abscess, four lumbrici were found encysted in the left pleura.

A man, æt. 23, who two years before had had slight peritonitis, suffered, in 1852, from return of this complaint, with especial pain in the left lumbar region; death ensued, with typhoid symptoms. In the left pleura, between the lower lobe of the lung, the thoracic wall, and the diaphragm, there was a sac formed of pseudo membrane, in which six lumbrici and a large quantity of brown fluid were contained. An opening in the diaphragm led into a cavity formed by adhesions between the upper end of the descending colon, the left kidney, and the diaphragm, and in which some lumbrici were also contained; this cavity, or abscess, communicated with the descending colon by three contiguous openings, situated on a level with the under part of the spleen. In the colon there were also lumbrici.

5. Dr. Bowditch speaks highly of a new stethoscope invented by Dr. Camman, which has the property of intensifying the auscultatory sounds so much, that respiration, or râles scarcely distinguishable with the common stethoscope, are heard plainly. The puerile respiration of a child is said to be "almost like the rushing of a whirlwind." The nature of the instrument is unfortunately not

described, but it is said that both ears are used, and that the earpieces fit tightly into the meatus. [We will give an engraving of the instrument as soon as we can obtain one.]

V. Diseases of the Digestive Organs.

1. *On the Examination of the Fæces in Health and Disease.* By Drs. Wehsarg and Ihring. (Inaugural Dissert., *Giessen*, 1853.)
2. *On a Case of Fatty Liver.* By Dr. John Bacon. (Amer. Journ. of Medical Science, April.)

1. Two interesting 'Inaugural Dissertations,' on the examination of the fæces in health and disease, have been made in the active clinical school of Giessen, under the superintendence of Professor Vogel. The first treatise is more physiological than pathological, but it will be useful to analyse it in this place.

Dr. Wehsarg has examined the healthy fæces. He makes a few remarks on the meconium and the fæces of sucklings, which includes nothing new. He passes on to the fæces of adults: we give his chief conclusions. After describing with unnecessary minuteness the forms, consistence, and odour of the fæces, he goes on as follows:

1. The reaction of the fæces is usually acid, but also often neutral or alkaline. The cause of the alkalinity (ammoniacal?) is not mentioned.

2. The quantity in twenty-four hours, averages ℥iv. ʒiss. (English); the extremes being, in these observations, ℥ij and ℥viij. (nearly). These differences depend on the peculiarity of the individuals, and also on other circumstances,—such as diet and external conditions. It may be said, as a rule, that the quicker the food passes through the intestines, so much the more copious are the fæces.

3. The quantity stands in no determined relation to the weight and height of the individual, but depends much more on his digestive power.

4. A normally firm stool contains on an average, in 1000 parts:—

Solids	267
Water	733
	1000

But the proportion in different persons varies considerably.

5. The excretion of solids in twenty-four hours averages about ℥j. (English). It varies from 247 to 880 grains (English).

6. The quantity of undigested food varies greatly; the average amount is about 52 grains. It does not appear that this amount of undigested food is less in those cases in which the intestinal contents are retained for a long time.

7. At least 48 hours are necessary before the bowels are entirely emptied after a meal. After exclusive flesh-feeding, the excess appears, after 48 hours, in the stools, and so, also, does the excess of cod-liver oil, when very large doses have been taken. Some substances need a longer time, such as grape-stones and fruit-seeds. Other substances are much quicker, such as sulphuric acid, magnesia (4 hours), and carbonate of iron (12 hours).

8. Under the microscope are found remains of food of various kinds; vegetable cells, hairs, spiral vessels; sometimes bread-crust. Muscular fibrillæ, coloured with bile, are always present. Starch is often found, and amorphous fat. Finely-divided "fæcal masses"—i.e., granulo-cellular masses without determinate structure, are also seen, and crystals of ammoniaco-magnesian phosphate, in all cases in which the stool is alkaline or neutral. Cholesterine plates have never been found.

9. The "æther extract," in 24 hours, averages 100—120 per 1000 parts (of the solids). Its range is 85 to 582 per 1000.

10. The alcohol-extract averages 156 per 1000. It is much increased in diarrhœa.

11. In the alcohol-extract, Pettenkofer's test for bile acids gave only once a positive result. Nitric acid added to the fresh fæces gave only twice an undoubted reaction of bile. Therefore, as a rule, undestroyed bile is *not* found in the fæces.

12. The water-extract averages 209 per 1000 of solids. It is increased in diarrhœa.

13. The amount of salts in the fæces is, as compared with the amount in the urine, very trifling. Sulphuric acid and chlorine are found only as traces, or frequently are absent altogether, unless large quantities are taken. The chlorine was found oftener than sulphuric acid.

14. The principal insoluble salt is phosphate of magnesia; phosphate of lime exists in very variable quantity; generally there are traces of iron.

Ihring has investigated the condition of the fæces in pathological conditions. After taking one ounce of rock-salt, a loose acid stool was passed which contained 20·8 per cent. of solid constituents, and among these were 6·6 per cent. of rock-salt. There was no sulphuric acid or bile-ingredients. A large portion of the rock-salt passed off by the urine.

Two loose stools, passed by a patient with tuberculosis of the intestines, had the following composition:

	I.		II.
Æther extract	11·8		9·5
Alcohol extract	28·2		35·9
Water extract	43·9		63·7
Insoluble salts	5·8	Chlorine	7·3
Chloride of sodium	9·0	Phosphoric acid	4·8
		Albumen	8·4

The stool of an hysterical patient contained a large quantity of gas, consisting of sulphuretted hydrogen and carbonic acid; the stool contained, also, albumen, and presented under the microscope many vegetable cells and muscular fibrillæ.

Some other analyses of a similar kind are given, and then the following conclusions are drawn from all the observations:

The stools may become changed both as to quantity and quality. In diarrhœa, the water is increased, and, compared to the water, the solids are diminished, but the absolute amount of solids excreted is increased. The quantity of undigested food is greater than natural. The alcohol-extract, which includes the biliary constituents, is increased; the water-extract and the salts are always increased; the earthy phosphates, and especially the magnesia-salts, are increased. Sulphuric acid is present in bilious diarrhœa; iron is present when purgatives have been given, and always when iron has been taken as medicine. Albumen is not present during purgation by medicine in healthy individuals, but is present in intestinal tuberculosis, in typhus, cholera, and dysentery.

2. Dr. Bacon determined the amount of fat in a highly-fatty liver; 750 grains yielded 398·5 grains of fat, = 53·13 per cent. The whole liver weighed 10 lbs., and contained, therefore, 5 lbs. 5 oz. of fat. The subject from which the liver was taken was highly intemperate, but was not tuberculous.

VI. Diseases of the Urinary Organs.

1. *Observations on Urine, according to Liebig's Method.* By Dr. Alfred Vogel. (Zeitschrift für Rat. Med. Band iv. Heft 3.)
2. *On Pyelo-Nephritis.* By Dr. Lamaestre. (Revue Med.-Chir. de Paris, Juin, 1854. pp. 321.)
3. *On Beriberi.* By J. L. Ranking, Esq. (Proceedings of the Hyderabad Medical Society, in the Indian Annals, No II. pp. 761.)
4. *Silicate of Iron as a Urinary Deposit.* By John Harley, Esq. (Lancet, August 12.)

5. *A new Method of determining the Amount of Urea.* By Dr. E. Davy. (Philosophical Magazine, June.)

1. Dr. Alfred Vogel has determined the amount of urea and chloride of sodium excreted in twenty-four hours, in a great number of patients. The now well-known method of Liebig was the one employed. The following are his conclusions:

(1.) In typhus (abdominalis = typhoid fever) and in pyæmia, the excretion of urinary ingredients (urea and chloride of sodium are the only ones determined, *Rev.*) is increased as long as the febrile symptoms continue. The chloride varies especially, according to the food; it is particularly diminished in great splenization of the lungs. The increase of the urea indicates the consumption of the nitrogenous tissues.

(2.) When the fever is over, the quantity of urea falls below the normal amount, in spite of the increased quantity of nitrogenous food; it then, after perfect recovery, returns to the physiological standard.

(3.) In morbus Brightii of both kidneys, without acute complication, the urea is diminished in amount, though the quantity of urine is usually increased. The chlorides vary according to the food, and to the increase and decrease of the dropsy.

(4.) Kidney calculus, or cysts, do not diminish the excretion of water and of urea, if a portion of the kidney is still capable of its functions.

(5.) In rapid absorption of serous exudations, the quantity of water and of the chlorides is greatly increased; the urea is also but moderately increased. Under these circumstances, the amount of the chlorides rises and falls in proportion to the quantity of urine; this is not the case with the urea.

(6.) In polydipsia hysterica the quantity of urine is enormous, but the absolute quantity of the urea and of the chloride is small. The solids of the urine are not augmented with the water; and of the solids (here examined) the chloride passes off more readily than the urea.

(7.) As determined by Heller and Beale, the chlorides diminish in pneumonia, as long as the hepatization proceeds, and increase after resolution.

(8.) A certain quantity of urea (6—8 grammes = $92\frac{1}{2}$ to $123\frac{1}{2}$ grains in twenty-four hours), is present in the most extreme atrophy, and when no nitrogen is introduced by food into the system.

On looking over the tables, we observe that the largest amount of urea ever noticed was in a case of pyæmia, in which it reached the enormous amount of 1235·5 English grains in twenty-four hours. The next greatest amount was in a case of typhoid fever, in which, in twenty-four hours, 1065·636 grains were passed. (The normal average, according to Bischoff, is 540·540 grains.) The lowest amount excreted was in a case of carcinoma of the liver, with great atrophy; on one occasion there were only 104 grains excreted in twenty-four hours.

2. The object of Dr. Lamaestre's paper is to call attention to one of the termination of pyelo-nephritis. When pyelo-nephritis has reached a certain point, and the urine and pus cannot be got rid, there is, of course, great dilatation of the pelvis and calyces (as in hydro-nephrosis). The tumour thus formed may finally open in various directions—viz.: (1) Externally, and then usually in the lumbar region. (2) Into the peritoneum; a very rare occurrence. (3) Into the alimentary canal. In the very few instances in which hydro-nephrosis was supposed to have opened into the stomach, great doubt exists whether such was the case. Of four instances referred to by Rayer, three were in hysterical women, and the fourth case is very imperfectly recorded. The opening into the duodenum is also very rare; only one case in medical literature is known to the author. The opening into the colon is much more common, and many cases are mentioned from the time of Avicenna to Rayer. The rupture into the rectum is again uncommon; one case is described by Cruveilhier. (4) Into the liver. The tumour, when on the

right side, has been known to contract adhesions with the liver, and finally, an abscess, formed partly by the kidney, partly by the liver, is produced. Once the liquid was known to traverse the liver, and penetrate through the diaphragm into the lung. (5) With the lung. Only 4 cases are on record (Rayer), and in 3 of these the disease was in the left kidney, and the perforation on the same side.

All these details are brought together by Dr. Lamaestre, in order to illustrate a case observed by himself. A woman had a tumour on the right side of the abdomen, as large as the head of an adult, extending from the liver to the iliac spine and umbilicus; it was perfectly dull on percussion, was hard and little painful. The urine was very thick, and deposited a large greyish (purulent?) sediment. After death, the tumour was found to be caused by a calculus imbedded in the ureter, which had given rise to an enormously dilated kidney, containing pus, and communicating with an abscess in the psoas muscle, which had passed downwards, and terminated in a cul-de-sac on a level with the little trochanter.

3. Mr. Ranking is of opinion that beriberi is a renal disease, a form of morbus Brightii. In 11 cases out of 16, he found the urine moderately albuminous. In 8 cases, which were all that were examined, there were blood-corpuscles, casts of tubes (in 2 cases), and epithelium. In 9 of these cases there was anasarca, co-existent in one case with ascites. In 14 cases there was numbness without actual anæsthesia. In 6 cases there was paralysis. In 7 cases there were symptoms of pericardial and endocardial affection. In 5 there was œdema of the lungs. No post-mortem examinations could be made in any of these cases.

4. In the case of a woman who suffered from pain in the back, and irritation in micturition, Mr. Harley found a sandy-looking deposit in the urine, which, on chemical examination, was found to be composed of silicate of iron. It is an obvious supposition, that the woman might have introduced the sand into the urine; but in addition to the deposit, it appears, from an analysis of the urine, that 5·4 grains of silicic acid were dissolved in the urine, and were passed in twenty-four hours. We should have been glad, however, to have known how Mr. Harley determined the quantity of the dissolved silicic acid.

5. We think it better to insert in this place, as well as in the Chemical Report, an abstract of an interesting paper by Dr. Davy. This gentleman has discovered what appears a simple, and, according to the present evidence, an accurate mode of determining the amount of urea. It is founded on a fact discovered by Dr. Davy, that urea is readily decomposed by admixture with the hypochlorites of soda, potash, or lime; its constituent nitrogen is given off, and from its amount the quantity of urea is determined by a simple calculation. The manipulation appears to be extremely easy; a measured quantity of urine is introduced into a graduated tube (partly filled with mercury), and then an excess of the hypochlorite of soda is added and the tube is inverted; in a few seconds the urea begins to decompose, the carbonic acid is absorbed by the hypochlorite, and the nitrogen collects in the upper part of the tube. In three or four hours the decomposition is complete.

Dr. Davy has made some comparative experiments with this and with Liebig's method; the results very closely accord. Sugar, albumen, bile, and excess of urinary colouring matter, do not affect the accuracy of the results.

[As this plan is easier and less expensive than that of Liebig's, it is of great importance to have its accuracy confirmed. We trust that Dr. Davy will give us more details on this point, as his discovery may possibly turn out to be of singular value. Circumstances have prevented us from personally testing the plan at present, and we have not been able to hear that any one else has examined it.]

QUARTERLY REPORT ON MIDWIFERY.

By Robert Barnes, M.D. (Lond.)

Late Physician-Accoucheur to the Western General Dispensary; Physician to the Metropolitan Free Hospital.

I. Anatomy and Physiology of the Gravid Uterus. Anomalies of Generation.

1. *On the Structure of the Placenta.* By Virchow. (Verhhand. der Phys. Med. Gesellsch zu Würzburg. Vierter Band, Heft 3, 1854.)
2. *An instance of a Fœtus in Fœtu.* By Dr. C. O. Weber. (Arch. fur Pathol. Anat. und Phys. Sechsten Bandes, Viert. Heft, 1854.)
3. *A Case of Superfœtation.* By Thielmann. (Med. Zeitung, Russl. 50, 1854.)

1. Virchow refers to a previous memoir on the dilatation of small vessels,* which process he described under the name of *cavernous ektasia,* comparing it to the corpus cavernosum of the penis in physiology, and to cavernous tumours in pathology. He ranges the maternal portion of the placenta in the same category. The death of a pregnant woman gave him a new opportunity of confirming and extending his interesting observations on the structure of the placenta. In two instances he has found in the uteri of puerperal women who had died soon after delivery, that the entire uterine mucous membrane is not necessarily separated on delivery. In these cases there was a raw surface at the seat of the placenta, whilst the remainder of the surface of the uterus still bore its mucous membrane (decidua) † The decidua serotina is nothing more than that portion of the uterine mucous membrane with which the ovum is in connexion, upon which it rests. The maternal placenta is clearly formed out of an hypertrophy of the uterine mucous membrane, and of vessels at first simple, and later of a cavernous ektasia of the vessels through the confluence of the dividing walls. In this last, the capillaries, and in part the arteries, but mainly the veins, contribute. Between the ektatic vessels, the tissue of the mucous membrane is, at a later period, for the most part, atrophied. As to the structure of the villi, he finds nowhere in the decidua elements which quite correspond with those of the villus-epithelium. When it is, moreover, remembered that the same epithelial layer is present in extra-uterine gestation, it must, he says, be in the highest degree probable that it is an integral component of the fœtus.‡

The author gives as his conclusions, that we must admit that the fœtal villi not only *grow through* the decidua, but also through the maternal vessels, and that later the villi hang free and naked in the maternal blood. In all cases there is, as Schroeder van der Kolk and Goodsir have so much insisted upon, a great cell-layer between the maternal blood and the villi, which the materials which have to reach the fœtal blood must pass through. This structure will naturally determine the exchange of materials, and, according to circumstances, may regulate or disturb it; and we may admit that these cells are not unlike the secretion-cells of glandular organs.

2. The case related by Dr. C. O. Weber is remarkable. Matthias Stamratz was born on the 1st Oct., presenting a tumour the size of a child's head attached to the sacrum. The tumour grew perceptibly, stretching the skin, and it seemed certain that the child would gradually sink. It was brought to the surgical

* Arch. für Pathol. Anat., Band iii.

† This agrees with the observations of Dr. Duncan, published in this journal, April, 1854. But if not cast off at once, it may be shed gradually yet completely.

‡ It will be observed that this view of Virchow's entirely confirms that which the reporter expressed in his article on Diseases of the Placenta, concerning the doctrines of Goodsir.

Clinique at Bonn on the 30th Nov., 1853. The tumour was immovably adherent, very soft, and seemingly for the most part consisting of fat; but two fingers were plainly felt united to the sacrum by a broad thick joint. The tumour was removed; suppuration followed in the wound, but the child eventually recovered, and was sent home at the beginning of 1854. The examination of the tumour showed that the two fingers, which consisted of three complete phalanges, and bore nails, were, by the apparent union of the metacarpal joints and some rudimentary wrist-joints, connected with the sacrum. This formed the basis of the tumour. A very soft fatty tissue constituted the greater portion. Near the surface was found a cyst the size of a goose's egg, containing about two ounces of fluid, yellowish-green, clear matter. The microscopic examination of this fluid showed blood-globules, epithelial-rudiments, and some fat-granules. The chemical examination made by Dr. Boedeker exhibited no pyin, fibrin, or albumen. It was identified with what Scherer has described under the name of paralbumin.

3. Dr. Thielmann relates the following case of superfœtation. A peasant-woman, aged 25, had borne, at 20 and 23, girls. In July, 1852, she became pregnant a third time; menstruation appeared twice after conception. On the 26th March, 1853, the first pains appeared, and next morning she was delivered of a girl, small but living; the afterbirth came away normally. The lochia ceased in a few hours. The secretion of milk was so scanty, that the child could not be supported by it. Eight days after delivery, the woman returned to her household duties; but she felt in her left side the movements of a second child. On the 18th May—that is, fifty-two days after the birth of the first child—pains came on, and the birth of a second living girl, somewhat smaller, followed. From this time the secretion of milk went on so freely, that both children derived sufficient nourishment. M. Thielmann says this case was officially certified.

II. Diseases of Women in the Unimpregnated State.

1. *On the Etiology of some Diseases of Women.* By W. Joachim. (Ungar. Ztschr. iv. 20 and 28.)
2. *On the Treatment of Uterine Deviations by Catheterism and the Intra-Uterine Pessary.* By MM Valleix, Depaul, and others at the French Academy of Medicine. (Arch. Gén. de Méd, June; L'Union Méd, April, May, June, July, 1854.)

1. Dr. Joachim has found that the establishment of menstruation takes place at different epochs in the different races dwelling in Hungary. In the Magyar peasant girls, between 15 and 16 years; in Jewesses, between 14 and 15; in Slovacks, between 16 and 17. Profuse menstruation is very common amongst Jewesses, whilst the Hungarian women more frequently suffer from retarded menstruation, with nervous symptoms. Protracted menstruation, also, is more frequent amongst Jewesses, which may be owing to the frequent use of the tepid bath. As remedies, the author speaks of vegetable acids, followed by phosphoric acid and preparations of iron.

He adverts to a form of leucorrhœa arising from want of cleanliness, and which may occur in young girls. He recognises a form of leucorrhœa having for its foundation a scrofulous diathesis; in this form the genitals are lax, the mucous membrane relaxed, sometimes ulcerated, the mucous secretion thin and dirty-grey. In these cases, cod-liver oil appears to operate especially upon the affection of the mucous membrane, the iodide of potassium upon the glandular system, muriatic salt-springs upon the sanguification, and sea-bathing upon the skin and nervous system. Syphilitic leucorrhœa is not uncommon amongst the inhabitants of Hungary and Siebenbürgen; the treatment of this is extremely difficult, on account of the singular mode of life of this people. A frequent cause of vaginal leucorrhœa in Hungary is found in the excessive use of spirituous drinks and emmenagogues;

crocus, sabine, and aloes are the chief of these. Discharges of blood are most frequent during the period of evolution. One of the most common causes of metrorrhagia is washing in marshes and fens; amongst delicate girls in the village schools, chastisement with rods not unfrequently gives rise to uterine hæmorrhages.

Simple congestion of the uterus bears a great resemblance to inflammation of this organ; the most common form is the rheumatic. Myorheuma comes on most frequently with fever; in the evening; piercing dragging pains come on in the pelvis, spread over the thighs and loins, and disappear soon to recur, until amidst spasmodic pains, a serous, or mucous, or sanguineous discharge takes place from the womb.

2. A keen and protracted discussion, in the Academy of Medicine, concerning the uses and dangers of the uterine sound and intra-uterine pessary in the treatment of uterine deviations, has recently elicited the opinions and experience of all the eminent obstetric practitioners of Paris. The immediate subject under discussion raised almost every important question in uterine pathology and therapeutics. It is not considered expedient to reproduce at any length the conflicting views elicited concerning many points branching out of the main question; but merely to give a condensed abstract of the more practical points. The occasion of the discussion was an elaborate memoir by M. VALLEIX, which had been called forth in order to refute the statement, that two fatal cases had occurred in consequence of the use of the instruments referred to.

The first case was related by M. Broca, and death was attributed to inflammation caused by the uterine sound. M. Valleix, analysing the symptoms, seeks to prove that the patient died of intestinal strangulation, aggravated by recent peritonitis, but that the catheterism had nothing to do with the production of these conditions. The second case was reported by M. Cruveilhier: the death was attributed to inflammation caused by the sound and wearing the intra-uterine pessary. M. Valleix calls in question the accuracy of the history of the case; and succeeds in throwing great doubt on the conclusion that the inflammation was owing to the local treatment. He thus proceeds to give the result of his general experience. He admits that accidents may arise during the mechanical treatment of uterine deviations. Out of 108 cases treated by the intra-uterine pessary, he has *once* seen symptoms of partial peritonitis produced; this, he says, might have been avoided, had he used then a shorter intra-uterine stem, as he has since done. *Five* times he has seen peri-uterine phlegmon; but the consequences have never been serious. Menorrhagia has been pretty frequent. He has witnessed attacks of hysteria, and ephemeral febrile attacks; but these were of no importance. He then cites the experience of M. Maunoix, of Geneva, who had supplied him with the *résumé* of six cases treated without accidents. M. Pinchaud had *once* met with excess of uterine sensibility, and in *three* cases menorrhagia, but without serious result. M. Gaussail reported five cases and no accident. M. Caradec, of Brest, several cases without accident. M. Broussonnet, of Montpellier, had *ten* cases; in *two* there was acute pain; and in *two* metrorrhagia. In *thirteen* cases treated by M. Le Diberder *once* treatment was suspended, on account of fatigue; and this patient experienced a slight febrile movement the first day. M. Valleix adds these 45 cases to his own 108, and observes, that true accidents happened only *six* times out of 153 cases, and that these accidents were all subdued.

M. Valleix then considers the pathology of uterine deviations, and the curative value of the mechanical treatment. In order to save space, and to present, in the most comprehensive form, the opinions of the different physicians who took part in the discussion, we shall classify these opinions under two or three heads.

1. *The Pathological Value of Uterine Deviations.*—M. Valleix admits that some women experience no inconvenience; but contends that in the great majority of instances serious symptoms result. Pain, increased by walking, and tactile examination, painful and frequent micturition, observed in 22 cases out of 35 of anteversion, and in 3 out of 33 cases of retroversion. Defecation was difficult and

painful 23 times out of 33 cases of retroversion, and 18 times out of 35 cases of anteversion. Then the general symptoms were severe. Metrorrhagia was frequent. Leucorrhœa existed in all without exception. Abdominal and intercostal neuralgia in a great number. Are these symptoms due simply to *increased size* of the uterus? He admits that in most cases the uterus is enlarged; but contends that since the symptoms disappear when the normal position is restored, that the deviation is the true cause. He further contends, that the enlargement and engorgement cannot be subdued, so long as the deviation is allowed to remain.

M. Hervey de Chegoin contends that simple displacement of the womb may cause serious local and general disturbance, but admits that deviations are sometimes the consequence of engorgement and other uterine disorders. M. Amussat expresses a similar opinion. MM. Valleix, Huguier, and Hervey all agree that sterility may be caused by retroflexion. M. Velpeau strongly contends that mere displacement, and especially retroflexion, may produce the most serious consequences, irritation and inflammation not only of the uterus itself, but of the surrounding structures. M. Robert describes two kinds of deviations: primitive, chiefly the result of sudden mechanical violence; secondary, following upon engorgement or inflammation of the uterus. The primitive deviations may be followed by inflammation and enlargement of the uterus as the *effect* of the deviation. M. Malgaigne, also, and other speakers, acknowledged that mere deviation was sometimes sufficient to induce local and general symptoms calling for relief. On the other hand, M. Cruveilhier maintained that the uterus, strictly speaking, had no proper axis, that its direction was at the mercy of the surrounding floating organs; hence deviation could not be a disease. M. Depaul advocated a similar view, and referred the symptoms complained of by women in whom deviation existed to primary structural disease of the uterus.

2. *As to the Efficiency of Mechanical Treatment.*—M. Valleix says, that in about *three-fourths* of the cases, the intra-uterine pessary has effected a radical cure. He says it has not been shown that there exists any other treatment applicable to all the cases, so effectual and so speedy. In the deviations backwards, the india-rubber pessary may be employed with advantage, on the condition of previously raising the uterus by the sound. He asserts emphatically, that in many cases the cure was definitive, the deflected uterus being permanently restored to its natural position. MM. Robert, Ricord, and others support the conclusion of M. Valleix, with some qualification. Velpeau thinks the intra-uterine pessary useful in some cases, and that the dangers have been greatly exaggerated. Amussat says, that in 1826, he had contrived an intra-uterine stem, but abandoned the use of it after one unfortunate case, in which a young woman, after taking too long a walk, whilst wearing the instrument, was attacked with inflammation and died. He says, the intra-uterine pessary can only give temporary relief, and is often dangerous. He advocates a mode of treatment he has himself imagined for the relief of retroversion: it consists in producing, by means of slight cauterization of the posterior part of the uterine neck, adhesions capable of maintaining permanently the erect position of the uterus. He cites several cases in which this proceeding was successful. Malgaigne thinks the intra-uterine pessary useful in exceptional cases. Huguier gives it a more extended application. He says it is especially useful in cases of *acute* deviation—that is, those produced by sudden violent exertion. He also asserts its value in certain cases of obstinate amenorrhœa: in such cases the instrument will frequently bring on periodical menstruation. In retroversion he prefers the air-pessary of Gariel.

Depaul strongly condemns both the intra-uterine pessary and the uterine sound, as useless and dangerous. Dubois admits that in some cases the stem-pessary is easily borne, and sometimes quite harmless. Sometimes, he says, it is followed by temporary relief; but he does not believe it has ever accomplished the end proposed; the inflected uterus has not been restored to its natural form, nor the deviated uterus to its natural position. He has employed the intra-uterine pessary experimentally at the Beaujon in 20 cases. In some the relief obtained was con-

siderable; but in all, the deviation persisted after the treatment was discontinued. He has also examined several patients who had been treated by Dr. Simpson, and has found the deviations existing. When relief follows, therefore, this is not owing to the rectification of the direction of the uterus; it is owing to the subsidence of inflammation, which may be facilitated by the support afforded by the pessary, in the same way as an inflamed testicle is relieved by support. M. Dubois thinks the instrument may be of especial service in certain cases of uterine hyperæsthesia, unattended by inflammation or deviation. He says, some of M. Valleix's successful cases were of this nature.

It is worthy of remark, that several of the speakers cited distinct and undoubted instances of retroflexed or bent uterus; a pathological condition, in the existence of which some physicians do not believe.

III. Diseases of Pregnancy.

1. *On the Danger of Jaundice in Pregnant Women.* By M. Carpentier, of Roubaix. (Rev. Méd.-Chir. de Paris. May, 1854.)

The writer observes, that of late many cases of jaundice had occurred in his neighbourhood, and that commonly the affection was by no means dangerous, but that the case was widely different when pregnant women were attacked. He remarked, that all those who were delivered in the course of the disease died in a day or two afterwards, in the midst of the most marked cerebral symptoms. He had collected 11 cases of this nature, and details 4 of the most interesting. The history of all is similar; and they reveal nothing beyond the fact referred to.

IV. Parturition.

1. *Case of Spontaneous Premature Delivery Thirty-six Hours after the Apparent Death of the Mother.* By Mayer. (Verh. de Phys. Med. Gesellsch. in Würzburg. 1854.)
2. *On the Action of Secale Cornutum.* By Feist. (Mon. Schr. für Gebtsk., iii. 4. 1854.)
3. *On the Aqueous Extract of Belladonna as a Substitute for Ergot.* By Dr. Soma. (Bull. Gén. de Thér. Tom. 47. 1854.)
4. *On Turning by the Head by External Manipulation.* By Hofr. Spengler. (Mon. Schr. für Gebtsk., iii. 2. 1854.)
5. *A Case of Cæsarian Section with successful result for Mother and Child.* By Hammer. (Schmidt's Jahrb. du Gesam. Med., Band lxxxiii., No. 7. 1854.)
6. *Cæsarian Section performed three times on the same Woman.* Case reported by Dr. Barjavel, of Carpentras. (Rev. Thér. du Midi. 1854.)

1. The case related by Dr. Mayer is one of remarkable interest. M. H., a well-nourished woman, 45 years old, felt the movements of the child for the fourth time in the middle of November. In March last, hæmoptysis and symptoms of inflammation of the right lung came on with some severity: these increased; and on the 31st March, apparent death came on by suffocation. For the two previous days she had ceased to feel the child. She was removed to the dead-house at 4 P.M. on the 1st April. She had remained, in the meantime, on her back in a warm room, covered up in bed, undisturbed for thirty-six hours. All the members of the family, and others, visited the deceased from time to time, and occasionally sprinkled her face with holy water. No one remarked the death-distortion of the features, or any cadaverous odour. When the undertakers were drawing on a shroud, they observed between the genitals a half-round, bright-red, smooth body, which they took for a prolapsus of the womb. There was a small

spot of blood with fibrine in the bed, surrounded by a larger wet place. The men had not observed the rigor mortis, nor the general loss of heat, nor any cadaverous odour. Early on the 2nd April, a few hours before the time for interment, the men thought to examine the swelling they had seen the day before. Great was their astonishment to find, between the thighs of the corpse, a new-born female child, dead, and connected with the mother by the umbilical cord. Dr. Meyer being summoned, found no absolute evidence of death, such as are commonly found fifty-four hours after death. The interment was stopped. The body examined; several old adhesions were found in the right pleura, and a pleuritic exudation in the right side of the chest; red hepatization and great congestion of right lung. The uterus was of the size of the fist, free from gaseous development, and laying in an oblique direction from right to left, so that the os uteri, widely open, was found behind the horizontal branch of the left os pubis. The placenta was still in organic relation with the fundus uteri; the inner surface of the uterus showed no trace of beginning maceration; the cervix was of a dark bluish-gray, whilst the cornua uteri and the two sides were of a bright red. The uterus' surface not covered by placenta was covered with fresh black blood-clots, which could only be removed by the scalpel. Nothing found in the body could render it probable that death had taken place, as it appeared to have done, fifty-nine hours previously.

The body of the fœtus confirmed the account of the mother as to its age, which she estimated to be twenty-one weeks. Dr. Mayer puts the following questions:—1. Was this woman really or only seemingly dead on the 31st of March? This he answers by referring to the absence of the usual signs of death, and concludes that she had fallen into a deep syncope, favoured by the warmth of the bed and of the apartment. 2. When and through what power was the delivery effected, or did the womb act after death? He replies, the birth took place about forty hours after apparent death, through long and feeble uterine contractions. He excludes the idea of delivery after actual death. 3. Was the child born alive? He answers in the negative. 4. Is it possible that the expulsion of the fœtus was effected in the dead mother by the development of gas in the abdomen? The condition of the body observed negatives this. (It seems to the reporter highly probable that the sprinkling of the face with water may have excited some degree of uterine contraction, so that the labour had begun before the removal of the body to the dead-house. The expulsion of the fœtus was effected solely by the peristaltic and diastaltic action of the uterus. The case bears some analogy to delivery under profound anæsthesia from chloroform.)

2. The researches made in the Charité at Berlin, leave no doubt that the ergot gathered before the harvest was completely efficacious, and that the ergot gathered after the harvest was wanting in any medical virtue. The manner of preserving it is important; it must be protected from moisture and insects. The indications for the administration of ergot mentioned by M. Feist do not differ materially from those generally admitted.

3. Dr. Soma relates three cases in which he gave the extract of belladonna during labour. He attributes to this remedy more energy and quickness of action than the ergot possesses. He observes that a dose unusually large was tolerated with advantage. He gave two or three table-spoonfuls of a mixture consisting of five ounces of the vehicle, and eight grains of the extract, every ten minutes. The cases related do not appear to be sufficiently numerous or precise to be conclusive as to the power of belladonna in exciting uterine contraction.

4. Hofr. Spengler observes that turning by external manipulation is usually recommended in those cases only in which the liquor amni has not escaped; but he relates a case of shoulder presentation, in which he succeeded in turning by the head long after the waters had escaped. It occurs to him that the woman

should lie upon that side on which the child's head is felt, and that a hard cushion should be placed at the spot where the head lies.

5. A primipara, aged 30, who had suffered from rachitis in early life, was seized with pains at the normal end of gestation, on the 2nd of February, 1854; the waters broke at 8 P.M.; the head did not come down into the pelvis, and the pains ceased. Turning was tried, but from the contraction of the brim, proved impossible; the conjugate diameter measuring two inches and a half only. The Cæsarian section was determined on at 11 P.M. The placenta was cut through in incising the uterus, and considerable hæmorrhage followed. The child, a boy, lived and was reared. Some degree of inflammation followed, but was subdued by treatment. Six weeks after the operation, the patient had quite recovered. The success of this case is justly ascribed to the operation having been performed before the patient had suffered from protracted labour.

6. Madame Crémieux, a Jewess, born about 1788, affected with marked deformity of the skeleton from scrofula, arrived at the end of her first pregnancy in 1812. The child presented by the feet. The late M. Laurans being called by the midwife, tried to extract it, but only succeeded in bringing away the limbs and the trunk, the head remaining in the uterus. M. Barjovel, père, effected the delivery by Cæsarian section; the woman recovered between the thirtieth and fortieth days. On the 27th of February, 1815, she was again in labour. The child presented by the back, and became impacted. M. Barjovel performed the Cæsarian operation again. The child lived down to 1833. The woman suckled her child. On the 22nd of April, 1819, she was again in labour. This time a young surgeon, recently arrived from Paris, was called; he adopted the method of Lauverjat (the transverse section on one side of the abdomen); but the patient sunk the same day of violent hæmorrhage.

QUARTERLY REPORT ON FORENSIC MEDICINE, TOXICOLOGY, &c.

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I. Medico-Legal Psychology.

Homicidal Insanity.—The case of Mary Ann Brough, tried at Guildford on the 7th August last, has excited considerable diversity of opinion upon the question of the legal responsibility of the prisoner, charged with the murder of six of her children. All the facts of this tragedy have been made familiar to our readers through the columns of the daily newspapers. Those only which bear upon the determination of the sanity or insanity of the prisoner need here be alluded to.

There was medical and other evidence to the effect that the prisoner had been the subject of disease of the brain since September, 1852. Her medical attendant, Mr. Izod, had warned her of danger from mental excitement. Dr. Winslow from a careful consideration of the facts of this case, had arrived at the conclusion that the crime was the result of a homicidal impulse beyond the power of the prisoner to control.

In answer to a question put by Mr. Bodkin, Dr. Winslow expressed an opinion, from what he had heard in the prisoner's case, that her brain was structurally disorganized, and he said this would render it much more disposed to be affected by any moral shock. He went on to say that the mere fact of an enormous crime being committed without any apparent motive would not alone induce him to come to the conclusion that the party committing it was insane, but he said that if he found any one had killed a near relation without any motive, and that it appeared

they had, up to the time of the act being committed, been on kind and affectionate terms, he should certainly think that, *primâ facie*, it was an indication of insanity, but he should not positively come to that conclusion without regarding all the other surrounding circumstances.

Upon being re-examined, Dr. Winslow said he was of opinion that, at this moment, the prisoner was suffering from disease of the brain.

Dr. Daniel and Dr. Ingledew were then examined, and they stated that they concurred in the opinions expressed by Dr. Winslow.

From the prisoner's statement, it appears that, just before the commission of the deed, "there was something like a black cloud" over her eyes; that she scarcely knew what she was about until after the loss of blood from her attempt to cut her own throat—"that nasty great black cloud was gone then!" and that she then again became fully aware of all that had passed. She had suffered during the whole of that day from headache, for which she had sent for medical aid, but her medical attendant being from home did not see her. She was, moreover, exhausted by watching and nursing her children, who were ill with measles. She had tended them with all the care and fondness which she had ever shown them. She had been known as an indulgent, careful mother. It is hardly necessary here to observe that this history resembles thousands of others, inasmuch as an irresistible homicidal impulse is commonly manifested towards the objects of the warmest affection.

There was, in addition to the circumstances connected with the actual commission of the murders, evidence that her mind had been in a sufficiently disturbed condition to have led her, a short time previously, to have contemplated suicide. A box was found in her room, containing plate and jewellery. "On the top of the box there was a piece of paper, and on taking this up, the prisoner said to the police inspector, 'I thought not of doing of it until Friday night.' The paper was read; it was as follows:—'All for my daughter Mary. Her father is only seeking to get money from them as never injured him or done him any harm, so help me God.—Mary Anne Brough.'" (Evidence of the police officer.) There were moral circumstances connected with her state of mind which must not be lost sight of. It had transpired that the prisoner had for some time previously been carrying on adulterous intercourse, which had recently been discovered by her husband, who had for that reason lived separately from her, and had threatened to remove their children from under her charge. It was to prevent this last separation, as she alleged, that she perpetrated the crime. "He had left me penniless," she said, alluding to her husband; "he was going to take the children—I thought he should not." "No mere strangeness of manner, no mere eccentricity of conduct, no mere delusion, were of themselves sufficient" (as was justly observed by Mr. Bodkin, the counsel for the prosecution) to establish the conclusion that the prisoner was insane. It was, however, apparent from the evidence of the witnesses, medical and non-medical, that this woman had been suffering for more than a year under disease of the brain—that she had, at the very time of the murders, a deranged condition of the cerebral circulation, caused by the fatigue of nursing and night-watching; this congestion, which had caused a "cloud" over her eyes, had passed away with the loss of blood resulting from her attempt at suicide. Such was the opinion of the jury; such was the opinion of the medical men who gave their evidence at the trial, as well of others who were not called on either side; and such must be the opinion, we think, of all who are capable of examining and judging, the medical facts of the case. We cannot, therefore, express sympathy with the invectives of the daily and other journals which have so angrily discussed the verdict of acquittal on the ground of insanity. The cry raised by some of the periodical literature of the day, with regard to the legal responsibility of this woman, savours too strongly of a demand for blood—a total perversion and misapprehension of the words, "Whoso sheddeth man's blood by man shall his blood be shed." The conclusions of these writers are, for the most part, founded upon an imperfect apprehension of their data, or they flow from a foregone conclusion: they are one and all untenable.

It cannot by any logical deductions be shown that the prisoner committed these acts *consciously*, and with a full knowledge at the time that she was committing a crime. There was ample ground to conclude that, previously, her brain was diseased; and it cannot be denied that, under such conditions, an uncontrollable homicidal impulse is not an unfrequent result. There was an entire absence of proof of premeditation. The motives which have been assigned are totally inadequate to account for such a deed by a woman who had always been a kind and fond mother.

Testamentary Capacity.—Roberts v. *Kerslake and Wife.*—An important case has been tried at the Warwick Assizes, August 4th. The will of the deceased Henry Roberts was contested by his sister and brother-in-law. The testator had always been eccentric and peculiar in his conduct, but had shown himself a shrewd and sagacious man of business, and had been very successful in his commercial transactions. About the time of the execution of the will he was suffering under bodily illness, which, it was alleged by the defendants, was of a nature to affect his testamentary capacity. On the other hand, it was maintained by the plaintiff that any appearance of insanity was merely the delirium of bodily illness, and not the delusions of an unsound mind, from which he was entirely free on the date of the signature. The health of the testator had been impaired since 1850; his ailments had been chiefly rheumatism and an affection of the liver. He for some time pertinaciously refused the aid of medicine; but when at last he consented to take medicine, his symptoms were improved for a time. His maladies, however, became augmented, and, on the day before the execution of the will, he was for a short time delirious. Between the date of that occurrence, and his death, he was, at various times, delirious, manifesting delusions on different and totally unconnected subjects. These delusions he did himself recognise to be such as soon as they subsided, as they did at intervals, and he became perfectly calm and composed.

Dr. Franklin, his medical attendant, had witnessed his signature to the will, and deposed to his mental soundness at the time. Dr. Franklin regarded these delusions as the delirium caused by disease of the liver, of which he died on the 1st of February. "Post-mortem examination of the body showed an enlarged and congested liver, and numerous gall-stones. The membranes of the brain were thickened, and there was serous effusion within the cranium. The white substance of the brain bore a diminished proportion to the cortical structure. The puncta cruenta were more numerous than usual. The skull was exceedingly thick."

Dr. Conolly, who had been many years acquainted with the testator, was also of opinion that the delirium in the present case was the result of the disease of the liver. Dr. Alfred Taylor considered that the morbid condition of the brain may have been the result of disease of four or five weeks' standing. The delusions noticed during life were attributable to disease of the liver.

The evidence adduced on the side of the defendants did not date the delirium before the first week in December. The most was made of the testator's eccentricities, which, however, it seems, had never prevented the witnesses holding intercourse with him as with any other sane man.

Dr. Winslow was of opinion that the morbid appearances observed within the cranium must have been of some months' duration. Dr. Winslow referred more particularly, as evidences of the previous long existence of insanity, to the thickened condition of the bones of the skull, the attachment of the dura mater to the medial line of the skull, the vascularity of the pia mater, the effusion of serum under the arachnoid, the thickening and opacity of the serous membrane. "Had I examined the testator's brain," observed Dr. Winslow, "and found the changes mentioned, I should, without any further knowledge of the case, have come to the conclusion that the testator died of mania."

With respectful deference for the opinion of Dr. Winslow, we cannot help thinking that a conclusion so arrived at would have been unsound. The same and greater morbid changes in the substance and coverings of the brain have been

found where, during life, there has not been the slightest mental disturbance of any kind. More frequently still, does insanity exist without leaving its traces on the brain. We should be disposed to doubt whether Dr. Winslow has been correctly reported, to have stated that sub-arachnoid effusion could not exist without deranging the mind.

The pathological conditions of insanity are as yet too little known to render it safe to trust more to post-mortem appearances than to symptoms manifested during life. In the case before us, we do not perceive the difficulty suggested by Dr. Winslow, of detecting the line of demarcation between eccentricity and insanity. Here the eccentricity has been known and recognised for many years; the delirium had been noticed only during the last few weeks of a life then drawing to its close from bodily disease. There had been no fixed or permanent delusions existing during all these years; but, during the last few weeks, changing and shifting delirious ideas, which moreover were sometimes entirely absent. There is a broad distinction to be made between mental derangement, and the delirium of bodily disease.

The testator possessed the power of fixing his attention upon any subject, and manifested correctness of memory, except when delirious. He had shown no sudden change of character; even his wanderings of mind partook of his usual violence or excitability of temper. We, therefore, cannot doubt the correctness of the conclusion of the jury, that the testator had a testamentary capacity at the time that he signed his will.

Testamentary Capacity.—Duke of Manchester v. *Bennett and others.*—This case has already been argued twice in court, and is again to be brought before a jury, leave for a new trial having been given. We shall reserve a fuller account of the evidence and opinions on both sides until the event of the ensuing trial. It may, however, be stated here that the will itself was in perfect conformity with the intentions of the testatrix, as expressed long before its execution. The validity of the document was contested on the ground that the Duchess of Manchester was not of sound mind at the time of signing her will. The testatrix had been ill for several months from bodily disease, which caused her at times to be delirious, and to give expression to delusions of a most absurd character. The evidence of Dr. Verity, the medical attendant, as to the matter of fact, was to the effect that the delusions were but the delirium resulting from bodily disease, and that there existed no permanent mental derangement. Other medical witnesses, expressing opinions only upon the evidence placed before them, came to the conclusion that the duchess was insane, and therefore not competent to make a will. Having carefully read the evidence as published, the latter opinion appears to be unfounded, and we anticipate a confirmation of the verdict of the first jury, that the will is valid.

Feigned Insanity.—M. Morel, Physician in Chief of the Asylum at Maréville, has given the following instructive case. Rambaud, convicted of forgery, was admitted in a furious state, attacking his keepers, and talking incoherently. This state continued for several days, but his delirium, when compared with that of others, presented peculiarities which caused M. Morel to suspect its reality, although he was not at that time aware of the cause of his admission. When asked his age, he answered, "It is five kilometres from here to Nancy;" to the question, "Of what country are you?" he replied, "Ah, you would assassinate me, you are in disguise," &c., &c. The peculiarities of his answers struck even the ordinary attendants; the truly insane do generally, notwithstanding the violence of their maniacal fury, return answers that have some connexion with the questions put to them, if they reply at all, although it is impossible to maintain a conversation with them.

Having been threatened with the cold douche, he became calm, but still incoherent. On its actual application, in the mildest possible form, the following day,

in consequence of his violence, he exclaimed that he was being murdered; becoming, however, much calmer. After a third trial, M. Krummer, *élève interne*, detected him, a few moments afterwards, talking rationally. He was then employed in writing, which he performed satisfactorily. Being visited by his mother and sister, his behaviour was that of a person much embarrassed, rather than that of an insane person, even during a remission. His bodily health continued good. About a month after his admission, it was observed that he was much in the epileptic ward, and closely watched one patient who had died in a fit. A few days afterwards he made an attempt to strangle one of the attendants, and immediately afterwards fell into convulsions. During this apparent epileptic seizure, the pulse remained unaffected, and the sensibility of the surface was in no degree diminished; the eyes closed directly a finger approximated them. He walked firmly to the bath, and on the first approach of the douche (a little cold water was sprinkled on his head from a sponge) he vociferously exclaimed that he was being taken to the guillotine, that the attendants were police officers in disguise, that he was being murdered, &c., &c. He then became sullen. On the following day he pretended to have attempted to hang himself, but had so arranged the knot of his handkerchief, that he could sustain no damage. M. Morel reported that the case was one of feigned insanity, to the truth of which the culprit subsequently confessed.—*Annales Medico-Psychologique*, January.

II. Miscellaneous.

Presumption of Survivorship: Case of Underwood v. *Wing.*—The loss of the Dalhousie emigrant ship, bound for Australia, in October, 1853, will doubtless be remembered by our readers. On that occasion only one sailor survived of all who were on board. Among those who perished were Mr. and Mrs. Underwood, of Bumpstead, in the county of Essex, and their three children. Being entitled to some property, the parents, previously to leaving England for Australia, respectively made their wills; the dispositions of which wills have come before the Master of the Rolls, as a question of survivorship. Mr. Underwood was forty-three years, and his wife forty years of age. They had one daughter aged eighteen years, and two sons of the respective ages of fifteen and thirteen. By their wills the one gave to the other absolutely their respective properties, providing that if the one to whom the same was given should die in the lifetime of the donor, the property should be equally divided among the three children, on their attaining majority; and that in case all their children died under twenty-one, they directed that their property should go to their mutual friend, Mr. Wing. Consequently by the provisions of these two wills, the gift to Mr. Wing was dependant upon the wife dying in the lifetime of the husband, or *vice versâ;* since, if it could be shown that both died at the same instant or point of time, they actually died intestate; the will being void, except in the case of the survivorship of either party. This was, in fact, the ground taken by the plaintiff, who claimed as next of kin to the daughter who survived.

The sailor, Joseph Reed, who survived the catastrophe, stated that he saw Mr. Underwood, and his wife, and two of the children, swept off the deck into the sea by a wave, and that they were not seen afterwards. The daughter was soon after seen struggling in the water; she was extricated by Reed and another sailor, and lashed to a spar, but has not since been heard of.

The point to be established was, that Mr. and Mrs. Underwood did actually expire at the very same instant in time:—a thing of the most extreme improbability. Medical evidence was given on both sides, the greater weight of which was to the effect that the husband must necessarily have survived the wife. Such was the opinion of Dr. Alfred Taylor, Dr. Brinton, Mr. Paget, and, we believe, others. The contrary opinion was held by Mr. Hancock and Mr. Wootton. The latter opinion must, however, be looked upon as wanting support from physio-

logical science, while the former may be laid down as an incontrovertible conclusion. Mr. Underwood was a tall, muscular, and powerful man, with a broad chest, and was a good swimmer. Mrs. Underwood was a little woman, of delicate habit. The scientific presumption from the circumstances and the condition of these two persons is, that the wife would immediately sink, and through fright would perhaps faint, and so be rendered powerless to make any effort to save herself, even if she did not die at once. Having on only her night-clothes, there would not be that physical means of buoyancy from the garments, which sometimes enables drowning women to float after immersion. The bodily conformation of Mr. Underwood would enable him to resist drowning, and maintain himself at the surface for a time. A strong male adult would be certain to make some effort to save himself, and as a good swimmer he would have still more chance; moreover, he would not be so likely to lose his presence of mind as a delicate nervous woman. It is, therefore, consistent with the laws of physiology, to conclude that Mr. Underwood survived his wife.

It was urged on behalf of the plaintiff that death was simultaneous from asphyxia, caused by submersion in the sea. From what has already been said, it is evidently next to impossible that these two individuals, so dissimilar as to physical condition, could have been equally submerged. Even supposing this to have been the case, it is not admissible by the laws of physiology that their hearts should both have ceased to beat at the same instant or point in time. A greater and longer struggle for life would of necessity exist in the stronger of the two. This is to be seen in the efforts for the resuscitation of drowned persons, which will succeed with strong healthy males, and will fail with females, *cæteris paribus*. It is also probable that the poisonous effects of the circulation of black blood in drowning are more rapid in proportion to the delicacy of the habit of body—more so in females than in males—more so in children than in either.

The Master of the Rolls, however, disregarding the medical evidence of such eminent physiologists, and adopting simultaneity of death in the loosest and widest possible sense, decided that there was here no survivorship! The similarity of the circumstances attending the deaths of these unfortunate sufferers was evidently taken by Sir John Romilly as constituting their deaths simultaneous! As well might he have affirmed that the deaths of all on board were simultaneous, because they happened on the same day; as much was the death of the daughter herself, upon whom survivorship and inheritance was decreed by the "Master," simultaneous. There is indeed no proof, either that she survived her father, as we know not how long he may have swum about; neither have we proof that the daughter is even now dead. The spar to which she was lashed has not since been found or heard of, yet it was one of the largest on board the ship, and well worth being picked up by another ship; though improbable, it is not impossible, that the poor girl may have been saved by some outward bound ship. Improbable as this may appear, it is far more credible than that Mr. Underwood did not survive his wife.

We may refer our readers to Dr. Beck, for an interesting collection of cases bearing upon this question. (Medical Jurisprudence, vol. i., chap. x. Albany, United States. Two Vols. 8vo. 1851.)

Death from Natural Causes or from Disease, where Poisoning has been suspected.—M. Tardieu relates the principal facts of thirty cases observed by himself in the course of a few years, wherein unfounded suspicion of poisoning has been raised. These cases are arranged as those where the cause of death was at once manifested by the autopsy, and those wherein the cause remained matter of doubt, and the further aid of chemical analysis was required. In the first category were: cases of ileus, or intestinal strangulation, of typhoid fever, of rupture of a cyst in the liver, of simple chronic ulceration of the stomach, ulceration with perforation of the intestines, acute peritonitis, pelvic tumours, cerebral congestion and hæmorrhage, pulmonary apoplexy, meningitis, pneumonia, asthma, morbus cordis.

In the second category were: cases of cholera, enteritis, gastro-enteritis, intestinal hæmorrhage, indigestion.—*Annales d'Hygiène*, July.

An interesting case of this kind (sudden death from perforation of the duodenum) is recorded in the 'Association Journal,' August 18, by Mr. J. S. Shepherd, of Manchester.

Period at which a Body Drowned will Float.—A man, named Shoemaker, was alleged to have been drowned on the 4th of September; the body was found floating on the 7th September, three days afterwards; if it were universally true that bodies do not float until decomposition takes place (in the waters of the Hudson under from six to ten days), then this could not be the body of Shoemaker. Amongst the conflicting evidence given on the trial was the following. Dr. Benjamin Budd, assistant coroner in New York, "had had occasion to see many drowned bodies, say 150. Never knew a body to rise in less than six days, unless some mechanical means were used to raise it. Should judge the body to have been in the water from ten to twenty days. Has never known a body to be in the water less than seven days that was mutilated by the fishes. Bodies that have been hooked up in three, four, or five days, have not that peculiar bleached appearance as those present that come up in from seven to ten days."

On the other hand, Henry C. van Wie, four years coroner of the county of Albany, has held a good many inquests on drowned bodies. Has known two or three instances where the bodies have risen in three or four days. They will bleach out directly in warm weather. They will be mutilated by fishes directly after decomposition takes place. Remembers an instance of holding an inquest on a body that drifted ashore, and had been drowned four, five, or six days. Had held in one season inquests on fifteen infants under three months old, found floating in cigar-boxes, near the city of Albany, cases doubtless of infanticide.—*Philadelphia Medical and Surgical Journal*, quoted in the *Lancet*, August 12, 1854.

In the same journal is the following:—A youth, named Ritter, recently fell into Elk River, in New England, and remained in deep water fifteen or twenty minutes before he was brought up, when he recovered as from an *epileptic* fit, to which disease he was subject, and by which he was attacked on crossing a log.

Death from Fright.—A man who had been two years bedridden having been seized with temporary delirium, walked down stairs into a room where his wife was sitting. She became so impressed with the delusion that she beheld his spirit that she died shortly afterwards from the shock to her nervous system.

Singular Mode of Strangulation.—A woman was found dead in a room with her neck resting on the edge of a fish-kettle. It was supposed she had fallen in a fainting fit, and, not having been able to rise, had thus become strangled.

Death from Starvation—Loathsome Condition of the Body during Life.—On the 25th May, a poor old woman, between 80 and 90 years of age, was found lying in a quarry, between Plympton and Tavistock, where she had lain since the 18th in a state of exhaustion and starvation. The persons who found her had at first taken her to be a mass of old rags. She was alive, but speechless and senseless. Every part of her was covered with maggots, called "hoppers," developed from the eggs of the *musca carnivora*. Her eyes were not visible, their cavities, as well as the mouth and nostrils, the ears, and the wrinkles on her face, being filled with maggots. The right side of the body was paralyzed. The left arm moved with some strength. She was placed in a warm bath, and freed as much as possible from the maggots, but they rapidly re-appeared. Some improvement took place in her condition, the pulse became stronger, and there was a promise of returning consciousness, but she died on the following day. From the empty state of the stomach and intestines, and the emaciated condition of the body, it was evident that the deceased had been starved to death.

There were no means of identifying the deceased, further than that a stick was found near her which had been given to her by a poor woman a week previously, and who had also given her a meal.—Abridged from the *Morning Herald*, June 5th.

The above case possesses this medico-legal interest, that had life been extinct when the body was found, it would have been supposed that death had occurred several days previously; had the question of manslaughter or suicide been involved, much perplexity might have been occasioned.

Supposed Poisoning by Pine-thistle.—In March last, three children and one adult, at Doucra, suffered from symptoms of poisoning, after having eaten the plant *chardonnette* (*atractylis gummifera, carduus pincus*). Of these individuals one, a child aged four years, died. This child, when first seen by Dr. Commaille, of Doucra, Algeria, was lying on its back, with its arms extended along the body, the legs stretched, the eyes closed, the teeth so clenched that it was impossible to open the jaws; there were large violet stains upon the integuments, the face was marbled with violet, the lips were bluish, the pulse imperceptible, the respiration slow, and the ribs raised by shocks. There were no convulsions.

The symptoms were very similar in another fatal case. Nineteen hours elapsed between the deaths. The younger died first. The elder had passed some away by stool, the younger had not. Post-mortem examination. Integuments of head and membranes, and substance of brain, greatly gorged with dark blood. The lungs and liver in a similar condition. The right side of heart also full of blood. Stomach healthy, except a patch of inflammation in greater curve. Mucous membrane of bladder inflamed—contained much urine. The remains of the plants were found in the stomach and intestines.

Decoction of the root of the atractyles acted as a poison on kittens, producing similar appearances.

Six cases of poisonous consequences, with death in four instances, from the same plant, are recorded in the Archives of the Institute, March, 1839, by M. Bouros, a physician at Athens.—*The Chemist*, August, and *Journal de Chimie Médicale*, June.

III. Toxicology.

Experiments upon the Woorara Poison.—M. Alvaro Reynoso has investigated various methods for retarding the absorption of this poison into the system, and of promoting its continual elimination, so that it shall not accumulate in sufficient quantity to cause death. The means employed by M. Reynoso are the caustic, cupping, and ligature. The ligature prevented the absorption of the poison during eight minutes that it was tried on the thigh of a guinea-pig. From M. Reynoso's experiments upon antidotes, it appears that iodine retards the absorption by altering the character of the woorara, but does not entirely prevent its absorption. Chlorine and bromine entirely decompose it; the latter, M. Reynoso thinks, may be applied with more success than anything else for the cauterization of wounds in which this poison has been inserted.—*Archives Générales*, August.

Toxicological Properties of Delphinin.—Dr. L. van Praag, of Leiden, gives the following summary of his investigations into the toxicological properties of this alkaloid, when taken into the circulation: restlessness, acceleration of respiration and heart's action, sense of heat and tingling in the mouth, irritation of the tongue, lips, and nose. After these first symptoms have passed off or subsided, the respiration becomes laborious, the heart's action slower, loss of muscular power, dilated pupils, anæsthesia, nausea, vomiting and purging, diminished secretion of urine. Dr. van Praag concludes that delphinin causes death by paralyzing the spinal cord.—*Virchow's Archiv für Pathologische Anatomie und Physiologie*, 1854.

Poisonous Effects of Nitrate of Potash.—The Correctional Tribunal of Alger, in

June last, was called upon to decide the amount of compensation to be awarded for injury occasioned by the administration of a dose of nitre by a *pharmacien* (from 10 to 12 grammes, = from 150 to 180 grs. Eng.), in mistake for cream of tartar. A debate arose upon the noxiousness or harmlessness of the nitrate of potash in such doses. The greater number of toxicological writers, it was alleged, adduced numerous instances of much larger doses having been taken without injury. One of the medical witnesses stated that the symptoms of *gastroenteritis* were attributable to circumstances in connexion with the condition of the patient at the time, and independent of the dose of nitre. The large doses in which other more powerful medicines are sometimes taken with impunity were also referred to; as also the extent to which nitrate of potash is now given in acute rheumatism. It was, however, decided by the Court that injury had been inflicted, and the apothecary was fined two hundred francs, besides having to suffer ten days' imprisonment.—*Bulletin Général de Thérapeutique*, July 30th.

The Detection of Phosphorus in Poisoning Cases.—M. Lipowitz has successfully employed a process for the detection of phosphorus, based upon the action exerted by sulphur upon phosphorus in a state of division. When these two metalloids are boiled together, they unite and form, according to their proportions, a pasty crystalline mass, which possesses the property of luminosity in the dark, a temperature below 100° C., or 212° Fahr., of being blackened by nitrate of silver, and of yielding phosphoric acid when treated with nitric acid. Chlorine and ammonia destroy its phosphorescence; but when ammonia is used, this property reappears on the addition of sulphuric acid.

In order to detect phosphorus when contained in organic matters, these are to be acidulated with dilute sulphuric acid, and distilled with fragments of sulphur free from sulphuric acid, and the product set aside for further examination. The residue, when cold, is to be washed, and subjected to the tests indicated. The phosphuretted sulphur will preserve its phosphorescence for a considerable length of time in water. After this has been lost, it still yields phosphoric acid to oxydizing agents. M. Lipowitz has detected the hundred and fortieth part of phosphorus.—*Journal de Chimie Médicale*, July.

Case of supposed Poisoning with Arsenic.—Early in April, 1853, C. B., the wife of D——, was seized with what appeared to be gastro enteritis; she possessed a feeble constitution, and had never enjoyed good health. The disease took its ordinary course, without presenting any alarming symptoms. On the 12th, the husband went to the physician, and informed him that his wife was dying, and therefore it was unnecessary that he should repeat his visits. Disregarding this intimation, M. M—— visited his patient, and found nothing to excite alarm. In the night, however, of the 13th and 14th, the patient was suddenly the subject of such serious symptoms as excited the suspicions of the medical attendant, and led him to fear the worst result. She was in excruciating pain, of a burning character, in the stomach. Vomiting was frequent. The abdomen tympanitic, and tender on pressure. The right arm and the lower extremities were paralyzed—symptoms inexplicable under the ordinary circumstances of such a case. The patient died on the 15th. The body was buried in a hurried manner, contrary to the injunctions of the authorities.

There was no doubt, from all these circumstances, that the deceased had been poisoned by her husband, who profited by the death, who had prophecied the event, and who, lastly, in order to conceal all traces of his crime, had hastened the interment, contrary to express injunctions. The unintentional admissions of the culprit confirmed the accusation. A friend who had partaken of the broth and of a fig, prepared for the deceased, had suffered from severe colic during two days. The accused was of an avaricious and sordid disposition, and attention once directed led to surmises that this was not the first crime of the same kind that he had committed for sake of gain.

After four days' interment the body was exhumed, and appeared in a state of good preservation. The face was thin, the integuments of the face, neck, and chest, were sound. The abdomen distended with gas, its integuments presented the green lines of incipient putrefaction. There were some traces of inflammatory redness in the stomach and intestines. A dark fluid was found in the stomach, apparently decomposed blood. The bladder appeared slightly inflamed, and contained a small quantity of dark-coloured fluid. Altogether, the post-mortem appearances which are recorded in the reports appended (with the prolixity usually to be noticed in such matters by French and German writers), presented scarcely enough to account for death either by disease or poison, but sufficient to excite suspicion of the action of arsenic.

Chemical analysis, performed by two medical men, gave evidence of traces of arsenic in the intestines, but not in the stomach. Slight traces were also detected by the employment of Marsh's test to clothes, &c., from the person of deceased, upon which a number of minute crystalline bodies could be discovered by the use of the microscope. Marsh's test obtained from the liver a few brown glittering stains; these were volatilized by a flame of hydrogen gas; they were immediately dissolved by a weak solution of chloruret of soda; they were readily dissolved by nitric acid; chlorine gas obliterated them, but they reappeared, of a bright yellow colour, by the application of sulphurous acid gas: from all these characters, it was concluded that these stains were arsenical.

Against this conclusion it was urged, on the part of the accused, that the analysis had been performed upon insufficient quantities of matter; that the alleged arsenical stains had not been obtained from the viscera of deceased, and that deceased had died from disease. The judge having regard to these representations, ordered re-exhumation of the body, and a further, more extended, and minute examination by distinguished experimenters in medico-legal analyses. The duty was intrusted to MM. Bussy, Chevallier, and Reveil, who were also required to state their opinion of the correctness and value of the previous medico-legal report. We can only find space for the conclusions of the elaborate report of these eminent chemists.

Experiments performed upon the linen, &c., of the deceased did not yield any traces of arsenic; neither did the fluid found in the thorax (the lungs, heart, and other viscera, had been removed for the preceding examination and analyses). No arsenic could be detected by them in the deeper muscles, nor in the other fluids of the body. Washings of the winding-sheet and other material taken out of the coffin yielded traces of arsenic, as did also portions of integument of the body, and some of the superficial muscles. The earth of the grave and of other parts of the cemetery in which the body had lain yielded arsenic; to the admixture of which with the remains of deceased, the reporters attributed the traces of arsenic they had discovered.

The spots obtained by Marsh's apparatus, and regarded as arsenical in the previous analysis, appeared to the reporters to present the characters of those caused by antimony rather than arsenic; their opinion was confirmed by chemical examination. The result was that the prisoner was acquitted.—*Annales d'Hygiène*, July.

Examination of the Remains of a Human Body Twenty-eight Months after Interment. Death from Poisoning with Arsenic.—M. Dieu relates the particulars of a case in which, by exhumation and analysis of the remains of a body which had been buried twenty-eight months, the fact of poisoning with arsenic was brought home to the culprit. We here confine our notice to the condition of the grave and its contents.

The soil was argilo-calcareous, the grave about six feet deep, and during the winter contained water. On opening the coffin, a skeleton was found denuded of its soft parts, and free from fetid odour. Some hair was adherent to the skull. The sternum and ribs had fallen in upon the vertebral column. From the position

of the bones of the superior extremities, it was evident that these had been crossed upon the epigastrium immediately after death. In the pelvis was some organic *débris*, and in the hollow of the sacrum a yellow mass, apparently resembling human fæces. The lower extremities, retained in their position by their ligaments, were, as well as the rest of the skeleton, reposing in a blackish semi-fluid mass, composed of the *débris* of organic matters, and having an earthy rather than a fetid odour. The bones of the hands and feet had become detached. Except the osseous system and the brain, none of the organs could be recognised. The brain was entire, but diminished in volume, by a kind of condensation of its tissue, which was more firm than in its normal state.

The peculiar condition of this body was due, doubtless, to its alternate exposure to inundation and dryness. These circumstances, however, do not explain the exemption of the brain from the process of putrefaction. The irregularities of its surface and its membranes had disappeared; the grey substance could not be distinguished from the white matter; the entire mass was of a greyish colour. When the cranium was opened, the most fetid odour was emitted, and the brain shortly after lost its consistence. It appeared as if the elements of fermentation, so long suspended, had rapidly resumed their activity on the occurrence of new conditions. Arsenic was detected in the brain as well as other parts of these remains.—*Annales d'Hygiène*, April.

Alleged Poisoning by the Introduction of Visiting Cards into the Mouth.—"In the month of August, 1853, Dr. Caffe was summoned to see a child who was suffering from the usual symptoms attending poisoning by a salt of copper. Dr. Caffe found the child holding in its hands and at the mouth some green-coloured cards, which the nurse would not take away for fear of making it cross. Vomiting was easily induced, and in the matter thrown up was found the cause of the symptoms. The infant rapidly recovered."—*Medical Times and Gazette,* July 15th.

The above history wants a definite account of the date of the occurrence and duration of the symptoms. Taking it, however, as it is, it appears more probable that the symptoms were attributable to Scheele's green, the symptoms of poisoning by copper not being so acute, and requiring longer for their development, than those of salts of arsenic.

Two cases are quoted from the *Gazette des Hôpitaux* in which lead poisoning undoubtedly was produced in children by swallowing pieces of white visiting card.

On the Detection of Copper in Organic Matters.—M. Georges has related a series of experiments, whence he concludes that the carbonization of animal matters serves for the detection of the presence of copper; the carbon washed in distilled water, without yielding any cupreous solution, will give evidence of its presence when acted upon by nitric or hydrochloric acid. Simple incineration M. Georges has found to be attended with volatilization of a salt of the metal, probably from its combination with chlorides; incineration, preceded by carbonization with sulphuric acid, is not open to the same source of error, but permits of the quantity of copper present being ascertained with exactness.—*Journal de Chimie Médicale*, April.

Detection of Arsenic in a Body after Ten Years' Interment.—On the 15th February, 1842, E—— was seized with pain in the stomach, cramps, thirst, and vomiting, and died in the evening of the 17th. On the 24th July, 1852, the body was exhumed: little more than its skeleton remained. The brown, crisp hair of the head was adherent to the cranium; the bones were covered with a slimy, gelatinous substance, in which, on the ribs and rings of the trachea, were sprinkled numerous yellowish-white chalk-like spots. The soft parts were not distinguishable. No odour was emitted on opening the coffin. The parts of the skeleton were in their relative anatomical positions, with the exception of the clavicles, the sternum, a few of the ribs, and the small bones of the hands and feet, which had fallen off.

On close examination, it was observed that the other bones were not retained in their position by ligaments, but were simply in contact, which the slightest touch disturbed. The thorax was open where the ribs had fallen in. No trace existed of the œsophagus, heart, or lungs; in the place of the lungs, there was seen only a brown, greasy mass, having the appearance of spleen. The liver had been transformed into a half-indurated substance; the other abdominal viscera were also half dried. The remains of these organs were placed in a jar, to be submitted to chemical analyses, which detected as much as ten grains of arsenic in the parts thus removed. A considerable quantity, it was evident, must have been taken during life, to have left so much after the vomiting, purging, &c., which had occurred. By this medico-legal investigation the crime was traced.—*Casper's Vierteljahrsschrift*, April.

Poisoning by the External Application of Arsenic.—A French peasant who had had chronic ulcer on his face for fifteen years, was persuaded by a carpenter to allow him to undertake the cure thereof. A plaster was applied, and on the same day the patient experienced general indisposition; on the following day severe headache, and vomiting and purging manifested themselves; after four days of acute suffering, the patient died. Chemical analysis proved the presence of arsenic. The carpenter was sentenced to three months' imprisonment.—*Journal de Chimie Médicale*, July.

In the same Journal for August, the case is related of a man who narrowly escaped death, at the hands of his wife, by the administration of a similar poison.

Chloroform in Poisoning by Strychnine.—A case is related in which the violent cramps caused by one or two grains of strychnine were prevented. The chloroform was inhaled from a handkerchief during four hours. The patient was a man forty years of age.—*Pharmaceutical Journal*, 1854.

Poisoning with Tobacco.—The *Times* of the 22nd of June, reported an instance in which a father gave to his male child, aged ten weeks, a small piece of tobacco, with the intent of making it sleep. The child slept during one whole day, was ill and peevish on the following day, and died on the fourth day.

Another case of poisoning by *bichromate of potash*, is recorded in *The Lancet*, May 20th.

Poisoning by Chemical Matches.—M. Bouchard detected the phosphorus from some matches in the case of a girl, who died in less than twenty-four hours from the accidental contamination of broth thereby.—*Journal de Chimie Médicale*, July.

REPORT ON THE OPHTHALMOSCOPE.

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Of the works, the titles of which we have given,* that of Dr. Van Trigt, translated by Dr. Schauenburg, is the one from which the following notice of the ophthalmoscope has been principally compiled.

* Helmholtz. Beschreibung eines Augenspiegel zur Untersuchung der Netzhaut im lebenden Auge. Berlin, 1851.—(Description of a Speculum Oculi or Ophthalmoscope, for the Exploration of the Retina in the Living Eye.)

Ruete. Der Augenspiegel und das Optometer. Göttingen, 1852.—(The Ophthalmoscope and Optometer. Göttingen, 1852.)

Coccius. Ueber die Anwendung des Augenspiegel nebst Angabe eines neuen Instrumentes. Leipzig, 1853.—(On the Employment of the Ophthalmoscope, with an Account of a new Instrument. Leipzig, 1853.)

Anagnostake. Essai sur l'Exploration de la Rétine et des Milieux de l'Œil sur le Vivant à

Dr. Van Trigt's work was composed under the guidance of Professor Donders, of Utrecht, and originally appeared as an academical thesis under the title of 'Dissertatio Ophthalmologica de Speculo Oculi,' and afterwards, with additions, in Dutch, in the 'Ouderzockingen gedaan in het Physilogisch Laboratorium der Utrechtsche Hoogeschool. Zoar V. 1852—53.'*

In the beginning of the eighteenth century, Mery having accidently held a cat under water, distinctly observed the colour of the bottom of the eye, and the blood-vessels ramifying thereon. Five years afterwards, Lattère examined the phenomenon, and showed that the eye held under water becomes so adjusted—the refractive action of the cornea being so neutralized—that the rays passing out from it are divergent; whence it is that they admit of being brought to a focus on the retina of the observer's eye. The retina of the eye under water thus comes to be seen.

When the human eye with the pupil dilated is viewed in a certain direction, a dark red reflection from the bottom may be seen. Attention was drawn to this phenomenon, and the conditions under which it is observable, by Mr. Cumming, in the 'Medico-Chirurgical Transactions' for 1846, and shortly after by Dr. Brücke, in 'Muller's Archiv.' The appearance is remarkably evident in cases of congenital absence of the iris, and had been some years before studied in a case of the kind by Behr, in 'Hecker's Annalen,' 1839.

Dr. Kussmaul, in an essay on coloured appearances at the bottom of the human eye, published at Heidelberg in 1845, endeavoured to explain how it is that the interior of the eye ordinarily appears dark and that the bottom is not seen. In illustration of the influence of the refractive media on the visibility of the bottom of the eye, he adduced the following experiment: Take an eye—a sheep's eye will do—and remove the cornea. On looking towards the bottom it will still be seen dark, because the retina lies nearly in the focus of the lens; but as soon as this body is removed, the retina and its bloodvessels become visible. That the position of the retina within or without the focus is the cause of its not being visible, he proved by removing a part of the vitreous humour. By this the lens approached the retina, which thus came to lie within the focus, and was seen as if through a convex glass magnified. Herein is afforded an explanation of the cases of far-sightedness in old persons in which the entrance of the optic nerve is visible at the bottom of the eye. By atrophy of the eyeball in like manner the retina comes to be distinctly seen. The same takes place when the retina is morbidly thickened, pressed forward by exudation, and, as is well known, in encephaloid tumour.

Dr. Brücke's observations on the reflection of light from the bottom of the eye we have above referred to. In illustration of the subject, Dr. Von Erlach communicated to him the following curious fact. Dr. V. E., who wears spectacles, noticed that the eyes of other persons appeared to him to shine when the person observed saw the image of the lamp flame reflected in Dr. V. E.'s spectacles.

moyen d'une nouvelle Ophthalmoscope. Paris, 1854.—(Essay on the Exploration of the Retina and the Media of the Eye in the Living Person by means of a new Ophthalmoscope. Paris, 1854.)

Van Trigt. Der Augenspiegel, seine Anvendung und Modificationen nebst Beiträgen zur Diagnostik inneren Augenkrankheiten. Nach dem Holländischen mit Zusätzen bearbeitet von Dr. C. H. Schauenburg, Docenten an der Universität zu Bonn. Lahr, 1854.—(The Ophthalmoscope; its Employment and Modifications, with Contributions to the Diagnosis of the Internal Diseases of the Eye. Translated from the Dutch of Dr. Van Trigt, with additions, by Dr. C. H. Schauenburg, Tutor in the University of Bonn. Lahr, 1854.)

Ed. Jäger. Ueber Staar und Staaroperationen, nebst anderen Beobachtungen und Erfahrungen aus seines Vaters, Dr. Friedrich Jäger, k. k. Prof., &c. &c., und aus der eigenen Ophthalmologischen Praxis. Wien, 1854.—(On Cataract and Operations for Cataract, with other results of Observations and Experience, from the Practice of his father, Dr. F. Jäger, and from his own. Vienna, 1854. pp. 89—109 in the Ophthalmoscope.)

* Researches carried on in the Physiological Laboratory of the University of Utrecht, in the Session of 1852, 53.

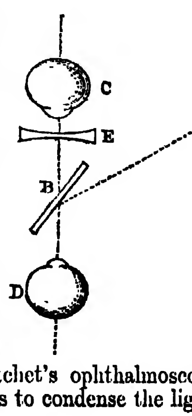
In this accidental observation of Von Erlach, it will be seen below, lies the principle of the ophthalmoscope.

Before passing in review the results of the exploration of the interior of the eyeball by means of the ophthalmoscope in order to establish a diagnosis of the morbid states of the vitreous body, retina and choroid especially, let us examine the construction and mode of employing the instrument.

Dr. Helmholtz, of Konigsberg, has the merit of specially inventing the ophthalmoscope. It is but justice that I should here state, however, that seven years ago Mr. Babbage showed me the model of an instrument which he had contrived for the purpose of looking into the interior of the eye. It consisted of a bit of plain mirror, with the silvering scraped off at two or three small spots in the middle, fixed within a tube at such an angle that the rays of light, falling on it through an opening in the side of the tube, were reflected into the eye to be observed, and to which the one end of the tube was directed. The observer looked through the clear spots of the mirror from the other end. This ophthalmoscope of Mr. Babbage, we shall see, is in principle essentially the same as those of Epkens and Donders, of Coccius and of Meyerstein, which themselves are modifications of Helmholtz's.

Helmholtz began by inquiring how it is that the pupil and bottom of the eye appear dark, notwithstanding that the retina, the place of entrance of the optic nerve, the vessels of the retina, &c., reflect light. He showed, as Kussmaul has previously endeavoured to do, that rays which, proceeding from a given point, come, by the refraction they undergo in passing through the dioptric parts of the eye, to a focus on the retina, return in the same direction, in so far as they are reflected from the retina, and that they, therefore, by the refraction they undergo on re-entering the air from the eye, converge again to the same point outside the eye as that whence they originally diverged. When we look into an eye, we intercept most of the incident light, and an image of our face, especially of our eye and pupil, is projected on the retina of the observed eye. But seeing that the reflected rays have the same direction as the incident, no rays from the observed retina can return to the eye, because they proceed from the place occupied by our pupillary image. Now, as from the pupil of the eye no rays proceed, it is natural and necessary that the pupil appear black.

The condition necessary, in order that light reflected from the retina of another person's eye may fall on our own, is this: that we look into the eye to be observed in the same direction as that in which the light is incident on its retina. Helmholtz effected this in a very simple manner.



The eye C looks into the eye D through B, which consists of four superposed glass plates disposed at an angle of 56°, and by which the light from it is reflected into the observed eye D in the same direction as that in which the observing eye C looks.

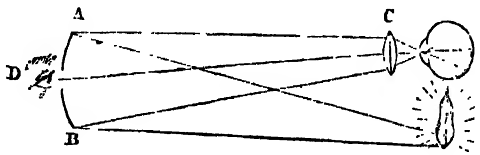
The rays reflected from the bottom of the patient's eye being, however, convergent on entering the eye of the observer, cannot come to foci on his retina. To meet this, Helmholtz interposed the concave lens E, whereby the rays of light from the bottom of the eye under examination are rendered somewhat divergent. They thus admit of being brought to foci on the retina of the eye of the observer, who accordingly perceives a distinct image of the appearances looked for. Follin and Natchet's ophthalmoscope* is merely Helmholtz's, with the addition of a convex lens to condense the light as it falls on the reflector.

* Mémoires de la Société de Chirurgie, tom. iii. Paris, 1853.

Coccius' ophthalmoscope consists of a small plain mirror with a hole in the centre, so placed that the light which falls on it from a lamp, concentrated by a double convex lens, is reflected into the eye to be examined. The observer looks through the hole in the centre. When the observed or observer's eye is short-sighted, a concave glass is placed before the observed eye.

Meyerstein's improved and simplified ophthalmoscope* is the same in principle as Coccius', only more conveniently and compactly constructed. The light is thrown into the observed eye in a similar manner by Donders' and Epkens' ophthalmoscope, but the adjuncts of the instrument are much more complicated. (See Van Trigt's essay for a detailed description.)

In the ophthalmoscopes just referred to, the reflection is effected by plane surfaces, on which, however, except in Helmholtz's, the light is condensed by a convex lens. In the ophthalmoscopes now to be noticed, the reflection of the light is effected by a concave mirror, whereby its concentration is at the same time secured. The annexed is a diagram of Ruete's ophthalmoscope. The rays from



the flame, as reflected by the concave mirror A B (10 inches focus), fall in a state of convergence on a convex lens C, in front of the observed eye. By this the rays are so much more converged that by the additional refraction they undergo on entering the eye they quickly come to a focus, cross, and fall in a state of great dissipation on the retina, so that this is extensively illuminated. The observer D looks through a hole in the middle of the concave mirror.

Ulrich's ophthalmoscope† is constructed on the same plan, but is more compactly arranged.

Anagnostakes' ophthalmoscope is simply a concave mirror, 4½ inches focus, with a hole in the centre, supported on a handle.

Jäger's ophthalmoscope, which appears to be very compact and convenient, may be adjusted with either a plane or a concave reflector, on Helmholtz's or on Ruete's principle.

It would be out of place here to attempt any account of the details of construction of the different ophthalmoscopes.

The anterior segment of the eyeball comprising the cornea, aqueous humour, iris, pupil, and crystalline body, admits of being explored sufficiently well for all practical purposes by the ordinary daylight, concentrated, if necessary, by means of a convex lens of about four inches focus.

For determining that the crystalline body still exists, the catoptrical test is of real practical value. Its use, moreover, in assisting the differential diagnosis of amaurosis and incipient—perhaps also black—cataract, is considerable, but is likely to be superseded by the ophthalmoscope. Formed cataract, long before the time when operative interference is called for, can always be sufficiently well observed, the pupil being dilated, by ordinary direct examination.

By means of the catoptrical test, it is not to be forgotten that in 1838, Dr. Mackenzie illustrated and confirmed the fact which he had discovered some ten years before, that the lens is the seat of the peculiar opaque sea-green appearance in glaucoma.

Whilst the morbid states of the anterior segment of the eyeball are thus suffi-

* Beschreibung eines neuen Augenspiegels, von Inspector Meyerstein, in Göttingen, in Henle und Pfeufer's Zeitschrift für rationelle Medicin, N. F., Band iv. Heft 3, 1854.

† Beschreibung eines neuen Augenspiegels, von Dr. R. Ulrich, praktischen Arzte zu Göttingen, (Henle und Pfeufer's Zeitschrift, N.F., Band iv. Heft 2, 1853.)

ciently accessible to objective exploration, those of the posterior segment, comprising the vitreous body, retina, and choroid, could formerly, with some exceptions, be determined only from the attendant subjective phenomena.

Of the exceptions alluded to, some, such as encephaloid tumour of the retina, &c., have been above instanced. The following passage, extracted from Mackenzie's 'Practical Treatise,' p. 508, third edition, 1840, gives an interesting example of a different kind:

"I had under my care, at the Glasgow Eye Infirmary, a young man with incomplete amaurosis in each eye. His vision had failed suddenly about two years before. At that time it was subject to frequent alternations, becoming suddenly diminished, and as suddenly regaining its usual acuteness. He complained of headache, with painful sensations over the body. He was troubled with red spectra before the left eye, but not before the right. The left eye was presbyopic, but with the right eye he perceived near objects more distinctly than distant ones. Deep in the right vitreous humour, a spotted opaque appearance was observed. On dilating the pupil by belladonna, it was evident that there were two sets of opacities behind the lens. One, consisting of a central spot with numerous opaque threads radiating from it, especially downwards and outwards, was situated exactly in the axis of the eye, and a little way behind the lens. The other opaque spot was much deeper in the eye, but without any radii, and evidently moved up and down when the patient moved his eye. Each pupil possessed considerable power of motion, and there was no tremulousness of either iris. I considered the appearances in the right eye as indicative of inflammation of the hyaloid. In two subsequent cases, I have seen similar appearances. In one of these I discovered what I considered the effects of hyaloiditis on *diverting the light of a gas jet through the pupil with a lens.*"

Furthermore, Dr. Mackenzie tells me that by concentrating the daylight by means of a convex lens he has seen red angular patches on the retina. The retina, when bulged forward and flapping in the dissolved vitreous humour, can be well seen.

Though the physical exploration of the state of the posterior segment of the eyeball has been hitherto incomplete, it must be confessed that this defect in our means of diagnosis was practically little felt. Having determined that the disease was not seated in the anterior segment, and thus *per exclusionem*, and from the nature of the subjective symptoms, together with the objective symptoms presented by the anterior segment, and by the eye considered as a whole, referred it to some part of the posterior segment, we were in a position to conduct our treatment of the case not with less efficacy at least than can be done now when it is possible, in many instances, to discover by means of the ophthalmoscope opaque spots, shreds, &c., swimming in the vitreous humour, and congestion with extravasations, exudations, and pigment-deposits in or behind the retina.

The use of the ophthalmoscope is necessarily circumscribed by the capacity of the eye to bear the concentrated light.

"If," says Van Trigt, p. 118, "the answer to the question, 'Has the treatment of eye diseases gained anything by the ophthalmoscope?' must be for the present in the negative, the high value of the results obtained would not on that account be, by any means, lessened. Diagnosis has the right to develop itself independently. Little advantage would have accrued to practice, properly so called, if diagnosis had taken for the standard of value of its discoveries their immediate use in practice, and thrown overboard without appreciation whatever did not come up to that standard.

"Therapeutics, which must rest on experience, begins where diagnosis ends. When diagnosis fails, there is not only no rational therapeutics, but empirical therapeutics even loses all consideration and all future, if not based on adequate differential diagnosis. *Spes therapiæ* is to be looked for only in the differential diagnosis of morbid processes and states.

"When a cure supervenes on any particular treatment, it must first be asked, *what* has been cured, if this experience is to bear fruit for future cases."

It is true, that in the exploration of disease every assistance must be welcome; especially such as enables us to observe the morbid changes of structure, and to connect them with the functional disturbance; but, unfortunately, what the ophthalmoscope discloses are morbid conditions, which are not, for the most part, more curable by being seen.

One important use of the ophthalmoscope, however, is illustrated in the following case: A boy about ten years old presented himself at University College Hospital, complaining of defective sight. He could see to read only by holding the print close to his eyes, but his sight was somewhat improved by the use of convex glasses of low power. The boy appeared in good health, and the eyes were quite natural looking; so much so that, as was learned from an independent source, the boy had been sent away from two different hospitals in London on the suspicion that he was feigning. As the boy's account of his defective sight was quite clear and consistent, I had no doubt of him, but to test the matter as far as possible, I examined the eyes with an ophthalmoscope, and found the vessels of the retina of both much enlarged and gorged with blood. The eyes bore the light without shrinking in the smallest degree.

The little help which the therapeutics of the eye has as yet derived from the ophthalmoscope appears evident from the results of the observations contained in the works before us.

We have above said that, for all practical purposes, opacity of the lens can be sufficiently well determined by ordinary exploration with the pupil dilated. By means of the ophthalmoscope, however, the smallest opaque points can be seen. For example, Professor Donders, under whose direction Van Trigt's essay was composed, suspected, from entoptical phenomena, the existence of opaque points in the lenses of his own eye, and such were in reality observed on their being examined by means of the ophthalmoscope. The same co-existence of lenticular opacity with entoptical phenomena was ascertained in Dr. Van Trigt's own case. All this is highly curious and interesting, but what advantage is it of to detect slight opacities of the lens such as cannot interfere with sight in any material degree? We often meet with cataractous opacity quite evident to ordinary examination, notwithstanding which there is still pretty good sight; on the other hand, cases occur in which the diminution of sight is not at all to be accounted for by the appreciable opacity of the lens.

Opacities in the vitreous body in the form of fixed spots, or of undulating membranous shreds and filaments, have been seen by means of the ophthalmoscope. Common muscæ volitantes, such as any person may observe in himself entoptically by looking through a small aperture in a card, have been proved to be owing to the existence of minute corpuscles in the vitreous body close in front of the retina; but when the undulating shreds and filaments, demonstrable by the ophthalmoscope, occur in the vitreous body, the appearance of muscæ has been found very exaggerated, and to interfere materially with the sight.

From Van Trigt's cases it results that affection of the vitreous body appears sometimes to be independent, at other times to proceed *pari passu* with affection of the retina and choroid. On the other hand, the retina and choroid may have undergone change of structure from chronic inflammation, without any opacity of the vitreous body having taken place.

There is nothing more easy than to repeat Mery's observation of the bottom of the eye of the cat and the vessels ramifying thereon, without plunging the animal under water. All that is required is, after having dilated the pupil by atropia, to put a drop of water into the eye, while the eyelids are held apart, and then to cover the cornea with a small thin plate of glass. By throwing concentrated light through the pupil while the eye is in this state, the ramifications of the vessels of the retina are distinctly seen. It has been proposed to explore the bottom of the human eye in a similar manner, and instruments have been contrived for the purpose by Brücke, Coccius, and Czermak, but the ophthalmoscope is of much more ready and convenient application.

Appearances presented by the Healthy Human Eye under the Ophthalmoscope.—The red colour which the bottom of the eye presents in man varies in tint. In fair individuals it is brighter; in dark people, on the contrary, it is more of a yellowish brown. The redness is owing both to retinal and choroidal vessels—the former being distinctly seen branching on the uniform red field formed by the more vascular choroid shining through the transparent retina. At the entrance of the optic nerve, which appears whitish-yellow and well-defined, the retinal vessels are seen emerging.

The arteries, of which two ramify upwards and two downwards, are distinguished at first sight from the veins, of which there are two principal trunks, an upper and a lower, by their less breadth and brighter colour. The mode of ramification of these vessels varies somewhat in different individuals. The veins lie sometimes under, sometimes over the arteries, and accompany them, so far as regards the principal branches, more or less in their further course.

A streak of pigment deposit may be seen at some part or all round the border of the papilla optica.

The retina in the situation of the yellow spot is seen to be little or not at all vascular, and sometimes of a greenish-grey appearance.

Morbid Appearances seen under the Ophthalmoscope.—It is undeniable, says Van Trigt, that in by far the majority of cases of blindness explored, morbid changes in the retina could be distinctly recognised. In some of the cases, no such changes being perceptible, we were obliged to refer the cause of the blindness to degeneration in the brain, or in the trunk of the optic nerve.

In one case (35), as the blindness commenced without photopsy, we expected to meet with an opacity of the vitreous body similar to that observed in a previous case (32). But on examination the vitreous body and retina were perfectly normal; and the remarkable course of the disease, especially the continuance of perfectly unimpaired vision of somewhat more than half the field, distinguished this case from all in which morbid change of the retina had existed. So far the cerebral seat of the disease was to have been *à priori* suspected.

In another case (34), the concomitant paraplegia indicated a cerebral cause. It might be supposed that when the eye had become quite blind from disease in the brain, some change in the retina itself must also have gradually supervened; as when the optic nerve becomes degenerated after section; and the spots observed in the last case would appear to warrant the supposition. On the other hand, case 35 shows that after a blindness of several years' continuance from a cerebral cause, the retina is not perceptibly changed. The same was also observed recently in a hemiplegic patient who had been long blind.

In two cases (37 and 38), though morbid degeneration of the retina existed, it was not very striking; the only changes were, in one case, the somewhat dilated and unusually distinct appearance of the choroidal vessels, and the irregular dark reflection between them, as also the undefined condition of papillæ of the optic nerve; there was no doubt that healthy eyes have never presented such an appearance.

In all the other cases related (continues Dr. Van Trigt), the morbid change was so evident, that even inexperienced observers could not have mistaken them. There were black irregular-shaped spots in front of the clear background, the nature of which Dr. Van Trigt could not determine, though he suspects them to be owing to pigment metamorphosis of extravasated blood, especially as he had seen the same appearance in several cases of injury of the eye. After extravasation in rabbits, intentionally caused, the appearances did not occur. Strongly reflecting white spots, and strong reflection generally, were not unfrequent. Other appearances observed were:—a grey-green discoloured bloodless-looking spot; increased surrounding redness, and great general vascular injection; moreover, change of colour, and an opaque state of the papilla of the optic nerve, strongly reflecting yellow streaks communicating together, which appeared to be choroidal vessels; and, lastly, the retina bulged forward and tremulous in the dissolved vitreous body.

"We have," continues Van Trigt, "hitherto had no opportunity of examining after death eyes which had been explored by the ophthalmoscope during life. We have examined the retina of a woman, in which there were numerous small extravasations of blood. Though no exploration had been made during life, the case is calculated to confirm us in the opinion that the black spots, of such frequent occurrence, have their origin in extravasations of blood. When there has been more opportunity to test exploration with the ophthalmoscope during life by anatomical examination after death, the diagnosis of diseases of the retina, Dr. Van Trigt thinks, will exceed in accuracy that of affections of other parts.

According to Professor Budge, Van Graefe, of Berlin, showed him a cysticercus in the eye with an ophthalmoscope (it is not said in what part of the eye). Coccius speaks of corpuscles which he was inclined to consider as entozoa or confervæ!

Jäger's observations with the ophthalmoscope, though less numerous than those of Van Trigt, give substantially similar results. One of his cases is so interesting as to merit being quoted at length. It appears to have been a case of mild arthritic posterior internal ophthalmia, ending in glaucomatous cataract.

"A. B., aged 72, of a robust frame, but troubled with piles, has been for the last year becoming emaciated, without any particular cause. Six weeks ago had repeated attacks of vomiting of blood, which have weakened him considerably. One day, after an attack, he found on awakening that his right eye had become quite blind, so that he could not perceive the hand moving before it, nor even the presence of light.

"Being called a few hours after, Dr. Jäger found, on making an ordinary examination, no perceptible change in the affected eye; but, by means of the ophthalmoscope, he discovered the interesting phenomenon of a disturbed circulation. The media of the eye were perfectly transparent, although increased reflection from the several strata was remarked. The retina appeared of a moderate yellow-red, without perceptible morbid alteration. The optic nerve, at its entrance, which had some pigment deposit at its circumference, and was more of a yellow colour than usual, presented only slight indications of blue spots. The vessels of the retina were, on the whole, not much enlarged, especially the larger trunks. The corresponding arteries and veins were of equal size, and both of a dark red colour; so that the arteries and veins could be distinguished from each other only by the direction of the stream of blood in them, which could be seen with great distinctness. There was no appearance of pulsation (not even in the arteries), as the walls, especially of the larger vessels, remained unchanged; but the circulation appeared, according to the diameter of the vessels, as a slower or quicker, an equable or interrupted (not rhythmical) progression of an unequally red-coloured stream of blood. In the principal vessels, the stream of blood, in the extent of one-fourth to a whole diameter of the vessel, showed lighter and darker red-coloured patches, which, however, by the progress of the blood, were always changing, so that the lighter patches became smaller, and quite ceased at one place to appear again at another. Then the progress of the blood appeared equable, but extremely slow. In the middle-sized vessels, the movement of the blood was quicker, but frequently interrupted for a short time; the lighter patches in the blood were of a paler red; these, as well as the darker, were of greater extent, as much as two or four times the diameter of the vessel. In the finest vessels visible in the optic nerve, the circulation appeared most rapid; but, at the same time also, the most frequently disturbed. The very fine stream of blood suddenly appeared interrupted, the dark red part of the blood drained away, and the little vessel, become scarcely visible on the clear ground, seemed to have assumed the colour of the optic nerve; by and by shorter or longer columns of red blood glided in an interrupted course through the vessel; and, after this, smaller aggregations of red corpuscles, when suddenly the vessel became filled in its whole extent with dark red blood, the individual parts of which seemed rather to roll in a rapid course than to flow smoothly. This circulation (which was of equal velocity in

the corresponding arteries and veins) gradually became visibly diminished, stagnation occurred here and there, so that at the end of twenty-four hours the circulation was completely stopped. The retina had now acquired a somewhat darker red colour than general. The diameter of all the vessels was evidently increased. The smallest vessels were proportionally more gorged with blood. There were no longer any light patches in the vessels, or an interruption of the uniform dark red colour of blood. The middle-sized vessels showed here and there a short interruption in their colour for the extent of half to two diameters. The chief trunks were, to a greater extent, equally filled with red blood. In the smallest and middle-sized vessels there was not the slightest movement, but in the larger there could still be observed, by attentive examination, a diminution of the lighter patches in the course of a minute or two, and at last a disappearance of them in one situation, and their reappearance in another. In such a condition of the circulation, we did not delay the application of a considerable number of leeches behind the right ear, notwithstanding the age and weakness of the patient. A favourable effect manifested itself before the leeches had all fallen off; the patient regained some sensibility to light, and could perceive the waving of a hand before the eye; the circulation of the blood became partly re-established—in the smaller vessels it was pretty rapid, in the upper branches slow, in the lower still arrested. By and by a stronger movement could be recognised, so that at the end of forty-eight hours the stagnation in the lower vessels had also ceased, and the circulation re-established in the same degree in which it was observed on the first day. There was, however, no diminution in the size of the vessels. The patient had now a more distinct perception of light, and could, though with difficulty, count the fingers of a hand held before the eye, and a little towards the temple. Considering the general condition of the patient, no further abstraction of blood was had recourse to. After twenty-four hours more, the velocity of the flow of blood was observed to be again diminished, but there was nowhere permanent stagnation; the sight had diminished, and some uniform dimness, with increased reflection, was seen in the lens. On the following day various changes supervened, but only slowly and gradually; and at the eighth day an evident difference in the character of the vessels could be for the first time distinguished. The veins retained their original size and colour, but the arteries presented a less diameter, and were no longer so much gorged with blood. The circulation was considerably accelerated, more so in the larger than in the smaller vessels. The motion of the blood, still perceptible by reason of the difference of colouration, appeared more uniform and less interrupted; very distinct in the larger and smaller veins, as well as in the larger arteries, but less perceptible in the smaller arteries. The lighter and darker patches in the blood had increased in number, but diminished in extent, so that the former might amount to from a fourth to a half, the latter to from a half to the whole diameter of the vessel. The opacity and reflection of the lens were not increased, but the sight not improved. On the twelfth day, the colour of the retina appeared lighter red, the size of the veins diminished. The difference between the arteries and veins in diameter, and the lighter colour of the former, were more evident. The greatest diminution in width was exhibited by the smallest veins and arteries, especially by the latter. The different colouration in the blood no longer appeared so uniformly and sharply defined, the circulation more equable and rapid, distinctly visible in the veins, less so in the larger arteries, and scarcely at all in the smaller arteries. The opacity and reflection of the lens were somewhat more increased, the sight nevertheless improved, so that the patient could count with accuracy the fingers of a hand held before him, and recognise the large objects in the room. Three days after this, the circulation could be seen distinctly only in the larger veins. The lenticular opacity had increased, the sight remained unchanged. On the twentieth day, on account of the increased opacity of the crystalline body, the circulation of the blood could no longer be perceived with sufficient distinctness, even in the venous trunks, and therefore further observation was prevented." (pp. 104—109.)

THERAPEUTICAL RECORD.

Albugo. Electro-puncture.—Dr. D. Tavignot (Bull. de Thér., Juillet, p. 49) relates the following:—A young girl, of 19, was attacked with catarrhal conjunctivitis, with enormous chemosis, and infiltration of the cornea with lymph, and a central ulceration occurred, then resolution took place, and finally central albugo was left. After simple acu-puncture, in order to accustom the eye in some measure, the electro-puncture was used. After four sittings, of some minutes each, at least two-thirds of the exuded matter were removed, but the pain was so severe at each application that the patient would not continue the remedy.

Anæsthesia, Local.—During the last two or three years, many attempts have been made to produce local anæsthesia, in order to obviate the necessity and peril of chloroform-inhalation. It is by no means improbable that these attempts will finally lead to some discovery which may be useful in surgery. We have alluded more than once to Dr. Arnott's application of cold, and we now propose to pass in review the other local measures which have been employed. Richet (Gaz. des Hôpitaux, 63—70; Schmidt's Jahrb., ix. 291) describes the older and recent attempts to produce local loss of sensibility by means of *ether*. The ether is simply dropped on the skin, and allowed rapidly to evaporate. Richet relates 13 cases, in 3 of which tolerably deep operations were performed—viz., the excision of two small tumours, and the amputation of a toe. In the other 10 cases, abscess or carbuncles were opened. Richet uses an apparatus, by means of which the ether is dropped on the part, and at the same time a current of air is directed on it, and causes rapid evaporation. Two or three minutes usually suffice. If a longer time be allowed to pass, some reaction may occur.

Ricord has applied the actual cautery to chancres in two cases after ether had been thus applied. In one case, no pain, in the other, very little, was felt. In the last case, the use of the ether had been continued too long (five minutes), and some feeling of warmth from reaction had occurred. Brochin also has opened a very tender abscess in the axilla, without giving pain, by means of the rapid evaporation of ether.

Chloroform, or its vapour, has been used frequently since Hardy's paper in the Dublin Journal, in Nov. 1853. The results have been variable, but in many cases insensibility has not been caused. Figuier has used *warm* chloroform vapour, a little apparatus being used, with a small spirit-lamp, over which chloroform vapour is driven.

Anasarca (Renal). Spartium Scoparium.—Dr. Alvarey (Bull. de Thér., Avril) has employed the infusion of this plant, as recommended by Rayer, in one case. In fourteen days the dropsy and the albuminuria had both disappeared.

Bougies, Spongy.—M. Alquie (Bull. Gén. de Thér., 15 Juin) has constructed bougies of the following kind: Round a whalebone bougie is rolled a sponge; this is reduced by compression to a third of its volume; it is then covered with gold-beaters' skin, and is covered with the salve used in ordinary bougies. The instrument when about to be used is dipped in water, and then, when its point has been touched with cerate, is introduced into the urethra. The sponge slowly imbibes the water, and swells so as to distend the urethra, supposing this to be the canal operated upon. Whether there is then any difficulty in withdrawing the instrument, or any danger of injuring the urethra in so doing, does not appear.

Ricord has used this instrument in two cases of stricture: it was introduced easily, but could not be borne more than an hour; it was withdrawn without difficulty, as the swelling of the sponge was not great.

M. Alquie points out various other possible applications of the sponge-bougies. He alludes to a case in which the fractured nasal bones were held in place easily by its means.

Cholera.—[We cannot attempt to enumerate in this short abstract the various plans proposed. We must content ourselves with a reference to those which appear to be, to a greater or less extent, novel.]

Strychnine.—Much discussion has arisen in Paris with respect to this remedy. M. ABEILLE (Bull. Gén. de Thér., Aout), its advocate, published a most sanguine statement of its powers, and termed it as certain a specific in cholera as quinine in ague. He gave the sulphate of strychnine in doses of one-third of a grain in two ounces of water four times in each twenty-four hours; at the same periods he applied thirty to forty leeches on the base of the thorax, according to the strength of the patient. The statements made by G. M. Abeille have led to the employment of strychnine by many physicians,—viz., See, Grisolle, Renouard, Fremy, Herard, and Vernois, and the result has been that not one of those gentlemen, after a very great experience of strychnine, has been able to perceive the least benefit in bad cases. In slight cases See thinks it useful. Moreover, it is stated by the editor of the 'Bull. Gén. de Thér.' (No. 4, 30 Août, p. 199), that he himself went to the Hôpital du Roule, where M. Abeille practises, and found that no other of the physicians there, including M. Boudin, in whose charge the cholera patients were, had the least faith in the practice. The report has also been read to the Academie (L'Union, Sept. 6) by M. Gerardin, on the documents submitted by M. Abeille, in which the statements of this gentleman are shown to be without support, even from his own evidence. We may observe that strychnine has been tried before, and found wanting.

Castor Oil. Dr. GEORGE JOHNSON (Medical Times and Gazette, Sept.) speaks in high terms of castor oil. He administers half an ounce every half hour in water; gives cold water *ad libitum;* employs external warmth, but gives no stimulants or opium. Out of fifteen cases of collapsed cholera he saved twelve.

In the 'Times' of September 21st is a Report, presented to the Board of Health by the Medical Council, in which Dr. Johnson's plan of treatment is reported on. It appears that it has been unsuccessful in the hands of others. Out of 89 cases treated by fourteen different practitioners, no less than 68, or 76·4 per cent., were fatal.

Croton Oil.—Dr. STARK (Lancet, Sept.) recommends croton oil: one drop with colocynth every hour, "till a full evacuation of bilious matter is procured." Diluted sulphuric acid, with a little sulphurous acid, is sometimes simultaneously employed to check the vomiting.

The Employment of External Heat and Cold.—In an interesting letter to the Editor of the Bull. Gén. de Thér. (Sept. 15th), M. Legroux states the opinions he has arrived at from the two measures above-named. He believes that the use of great degrees of heat is positively and considerably hurtful. Even moderate heat appears to do harm. "Moderate as it may be," says M. Legroux, "heat, whether applied externally, or in the form of hot drinks, augments the malaise and the anxiety. Few of the patients find relief. But when the heat is extreme, and produced by the agency of hot metal, bricks, bottles, hot bags, and when thick covertures, cushions, and eider-down pillows are added, the anxiety becomes inexpressible, the dyspnœa is extreme, the patient tosses about vainly, imprisoned as he is by his coverings, for the purpose of perceiving and breathing the cool air; the epigastric fire increases, and the cramps augment in the direct ratio of the heat. It is a veritable torture, a frightful torment. . . . . Great heat is fatal to patients with cholera. This fact is incontestable, and the public should be warned of it."

On the other hand, Legroux has found evident benefit from cold, iced drinks, from allowing the patient to roll freely in bed, so that the cool air may blow upon him.

The author speaks very highly of the effect of sinapisms. "To conclude," he says, "the fatal effect of an excessive calorification, the benefit of sinapisms, and the good effects of cold drinks, are the only therapeutical facts which it is possible to generalize in the confirmed algide cholera."

Production of Artificial Dropsy in Cholera.—Mr. Richardson (Assoc. Med. Journ., Sept.) proposes to inject fluid into the peritoneal cavity or the cellular tissue, under the idea that it will be absorbed readily. Some experiments are related to show how easily and how safely the plan may be carried out. We are not aware that it has been tried on any cholera case. [Unfortunately, we are afraid that this ingenious suggestion will, like other plans, not succeed. Strychnine, iodide of potassium, and other remedies, have been injected into the cellular tissue, but have not been absorbed.]

Sulphuret of Potassium.—Dr. Fromentel (L'Union, Août) dissolves this substance in water, with or without sugar, and gives a tablespoonful every half hour or hour.

Sulphuric Acid.—Dr. Fuller (Med. Times and Gazette, August) repeats the favourable opinion he formerly expressed of the utility of this remedy. One ounce of the dilute acid of the 'Pharmacopœia' is added to eleven ounces of water, and one ounce and a half are given every twenty or thirty minutes, according to the severity of the case. Six or eight doses altogether are given.

Cold as an Anæsthetic Agent.—Dr. Wood (Amer. Journ. of Med. Science, July, p. 287) has used cold as recommended by Dr. Arnott. In most cases it met his expectations, but in others entirely or partially failed. Its use is said to be restricted to the minor and superficial operations.

Coryza. Opium Fumes.—In those cases of coryza which are attended with severe pains in the nose and frontal sinuses, Dr. Lombard (Bull. Gén. de Thér., Août) has used with great success the fumes of partially burnt opium. The patient medicates himself by throwing on a slip of metal heated in a lamp a few pinches of opium powder, and then inhaling strongly so as to draw the fumes up the nose. A grain and a half or two grains of opinion may be used each time.

Croup. Tracheotomy.—M. Guersant (L'Union, 3 Juillet) gives the statistics of tracheotomy in croup at the Hôpital des Enfans Malades. Up to 1850 the mean numbers of operations were ten (annually); in 1851, there were twenty-five; in 1852, there were thirty; and in 1853 there were sixty. Of 161 children operated on, thirty-six were saved, or one in five, and Guersant believes that this fortunate result would have been still more marked, had the operations been performed earlier in the disease than was generally the case.

Dr. Archambault (L'Union, 8 Juillet) relates two cases of croup, arrived at the last stage, in both of which the operation was completely successful.

Delirium Tremens. Tartar Emetic.—Dr. Peddie (Monthly Journal, June) discountenances the treatment by opium, and recommends, from an experience of 80 cases, the use of tartar emetic, in doses of from one-quarter to one-half of a grain every two hours. If the bowels are not opened by this remedy, compound jalap powder is given. The patient is not to be restrained by mechanical means, and light is freely admitted into the room, as by its means optical delusions are prevented.

Diarrhœa. Subnitrate of Bismuth.—M. Trousseau (L'Union, Août) recommends injection of subnitrate of bismuth suspended in water. It is used with excellent effect in the case of children as well as of adults. For children, about half a drachm is diffused through a little water, according to the age. *Syrup of Poppies and Lemon Juice.*—M. Yvaren (Rev. Méd. Chir., Juin) recommends in diarrhœa, especially in children, and in autumnal cholera, the following preparation: In a pint and a half of water he boils a poppy-head, with one and a half or two ounces of gum arabic, for fifteen minutes; he then strains the liquid, squeezes in the juice of two lemons, and sweetens sufficiently with sugar. A pleasant beverage is formed, which, according to the age of the patient, is administered in greater or less quantity.

Digitalin.—Dr. LANGE (Deutsche Klin. and Schmidt's Jahrb., No. 7, p. 26) has employed digitalis in intermittent fever and in dropsy. In six cases of the former disease cure was not effected in a single case, even after eight to ten days' use. In dropsy, diuresis was scarcely ever observed; in one case of general renal anasarca, after eight days' use of the remedy, there was for forty-eight hours some increase in the flow of urine, but this then disappeared. In three cases of cardiac dropsy the heart's action was lessened in one (after $\frac{1}{60}$ grain doses every three hours), but there was no diuresis, although the specific effects of the digitalin were thus evident. In the two other cases there was no diuresis whatever.

Dropsy (Ovarian). Iodine.—Dr. SIMPSON (Monthly Journal, May) refers to seven or eight cases of ovarian dropsy in which, after tapping, tincture of iodine (two or three ounces) has been injected into the sac. In two or three cases the disease seemed arrested, but in the others this was not the case. No great pain followed the injection, and no febrile symptoms, except in one case.

Eczema. Traumaticine.—Under the name traumaticine, EULENBERG (Allg. Méd. Centralzeitung, and L'Union Méd., Juin) has employed in a case of chronic eczema, and in one of psoriasis, a solution of gutta percha in chloroform. The solution is painted on daily, and a thin pellicle forms, which is of course gradually detached.

Epilepsy. Oxide of Zinc.—The oxide of zinc, so strongly recommended by Herpin in epilepsy (see No. 22, p. 409), has been tried both by MOREAU and DELASIAUVE (Traité de l'Epilepsie, p. 373). Moreau experimented on 11 patients, and rigorously observed Herpin's instructions, but the results were completely negative. Delasiauve's experience, on a still larger scale, is to the same effect. In reference to the employment of the oxide of zinc, we may mention the interesting observations of Michaelis (Archiv für Phys. Heilk., 1853), who, in experiments on animals, found the zinc in the liver, bile, blood, spleen, lungs, heart, brain, and urine. The oxide appears to be dissolved by the lactic acid in the stomach; it should, therefore, not be combined with magnesia, which would neutralize the acid.

Epilepsy. Atropine.—Dr. LANGE (Schmidt's Jahrb., No. 9, p. 299) has used atropine in 10 cases of epilepsy (three men and seven women). The three men, who had suffered from the disease for many years, were cured in three, five, and six weeks. Two of the women were not improved, one died, and three appeared to be cured, as, after from five to eleven months, they had had no fresh attacks. In the last case, one of epilepsy and commencing idiotcy, the atropine failed. The dose appears to have been about the 1-100th of a grain. M. Delasiauve, in his late treatise on 'Epilepsy' (p. 369), states that he has experimented with belladonna for many years at the Bicêtre, and that, while he has seen some cases in which the fits were for the time suspended, he has only seen one instance of cure.

Erysipelas. Tincture of Iodine.—Dr. DURKEE (Amer. Journ. of Med. Science, July, p. 109) recommends the local application of the ætherial solution of iodine, poured in quantities of twenty to thirty drops upon the part, and immediately spread over the surface with a brush. The skin is to be made nearly *black* with the iodine.

Fever (Intermittent). Phosphorus in Oil of Turpentine.—This remedy has been employed by Dr. SCHREIBER (Schmidt's Jahrb., 1854, No. 3, p. 298) with good effect. He dissolves two grains of phosphorus in three drachms of the oil, and gives fifteen drops every hour.

Gonorrhœa. Subnitrate of Bismuth.—Both in acute and chronic gonorrhœa Dr. CABY employs, three times daily, an injection, composed of water mixed with as much trisnitrate of bismuth as can be suspended. It is to be retained five minutes; it causes no pain.

Hemicrania. Caffein.—EULENBERG speaks highly (Allg. Méd. Central Zeit., and L'Union Méd., Juin) of the effect of caffein in hemicrania, in doses of one grain

and a half every two or three hours. He has also employed the citrate of caffein. On account of the dearness of caffein he has used with good effect the extract of coffee, four grains of which are equal to one grain of caffein.

Hydrocele. Collodion.—VELPEAU (L'Union, Juillet) applies collodion over the scrotum on the third or fourth day, after the usual operation and iodine injection. The secondary inflammation and engorgement are much lessened in severity and duration. Velpeau intends to apply the collodion immediately after the operation in the next case he has to treat.

Iodine Inhalations.—For patients for whom such inhalations are ordered, Dr. BARRERE (L'Union, Août) recommends the following plan: Powdered camphor is placed in a small box, and over it a muslin bag is placed containing a little iodine. The vapour of iodine is absorbed by the camphor, which assumes a dark colour. The compound thus formed (campho-iodine) is inhaled.

Iodo-tannic Solution.—M. DESGRANGES (L'Union Méd., Juin) has employed this solution as a substitute for the perchloride of iron, as an agent for coagulating the blood in aneurism. He finds, however, that it is much less powerful, and that it is soluble in the alkaline fluid of the blood. Moreover, first the iodine and then the tannic acid are absorbed, which is not the case with the perchloride of iron.

Labours (Slow). Belladonna.—Dr. SOMA (Bull. Gén. de Thér., 1854, p. 547) relates three cases, to show that the extract of belladonna excites, like the ergot of rye, the uterine contractions, and may be substituted for it, especially in cases of spasmodic vomiting. Of course it is to be employed only in cases in which the os is dilated and the position of the child favourable. The dose is not clearly stated, but appears to have been large (about half a grain), and the medicine was given every ten minutes for two or three hours.

Laryngitis. Nitrate of Silver.—Dr. EBERT (Annalen des Berlin Char. Krankheiten, 1854, s. 1, p. 89) employs inhalations of nitrate of silver in substance with great benefit, in all inflammations of the laryngeal mucous membrane. He has employed the nitrate of silver also in solution, after the manner of Green, but has never been able to satisfy himself that the larynx was really entered. The mode in which the solid caustic is introduced is as follows: Three grains of the nitrate are mixed with one drachm of sugar; the powder is placed in a steel pen, which is itself firmly inserted in a quill open at both ends. The little apparatus is then put into the mouth, so that the end of the steel pen shall be on the root of the tongue; then the lips are closed round the quill, and the patient inspires forcibly. The first attempt is almost always a failure, and the nitrate is only tasted on the root of the tongue, but the patient soon learns to manage it very well; a little cough and irritation follow, but no great uneasiness. For young children this method does not answer, and a special apparatus must be used.

Lead, Poisoning by. Iodide of Potassium.—In 23 cases of saturnine disease—including colic, neuralgia, arthralgia, wrist drop (4 cases), and general paralysis (6 cases)—the iodide of potassium has been used by Dr. SWIFT, as recommended by Melsens. (New York Med. Times, Feb., and Amer. Journ. of Med. Science, July, p. 286.) 16 cases were cured; 3 so far relieved as to be able to resume their occupations; and 4 were gradually improving at the time the report was made. "In 13 cases the urine was submitted to chemical analysis, and the investigation has established the fact, that the lead may be eliminated from the system by the iodide of potassium, and found in the urine. In no case was the lead detected before the administration of the remedy. The analyses were made by Prof. Outram, and the results of his experiments are perfectly reliable." In one case the lead was detected also in the saliva.

Leucorrhœa.—Dr. MAYER (Rev. Méd. Chir. de Paris, Mai, p. 299) recommends that in the treatment of leucorrhœa, cylinders formed of fine muslin and "charpie" should be soaked in a solution of alum, sulphate of zinc, of iron, or of nitrate of

silver, and introduced into the vagina by means of the speculum, which is withdrawn when the cylinder has been introduced into it. The cylinder must be of good size, so that the folds of the vagina may be obliterated. The cylinder is retained in for ten or twelve hours. The alum solution is preferred by the author, and its strength is one part to fifty, to twenty-five, and to twelve of water successively. Three cases only are referred to, and all were in prostitutes. In the first case the cylinder was introduced six times; in the second, fifteen; in the third, five times.

Subnitrate of Bismuth.—M. CABY (Bull. Gén. de Thér., Août) recommends strongly the local application of bismuth, by means of the speculum and lint, on the neck and mouth of the uterus, and on the vagina, as the speculum is being withdrawn. There is no pain. The application should be made daily. Before using the bismuth a water injection may be used, to clear away the discharge from the membrane.

Lime, Phosphate of.—Dr. KUCHENMEISTER (Schmidt's Jahrb., 1854, vi. p. 298) recommends the following formula in cases in which phosphate of lime is indicated:—Calcis phosphat., ℥ij.; calcis carbon., ℥j.; sacch. lactis, ℥iij.: ʒss. bis terve in die. Instead of the milk sugar, lactate of iron may be substituted, if iron be required. The especial use of the carbonate of lime appears to be that carbonic acid is liberated by the acid of the stomach, and dissolves the phosphate. Lactic acid also is formed from the sugar, or is set free from the lactate of iron, and dissolves the phosphate. The most ready way of absorption is, however, when the phosphate is given with food, especially with milk, with which it forms a soluble combination.

Lupus. Biniodide of Mercury. Dippel's Animal Oil.—CAZENAVE (Bull. Gén. de Thér., 1854, p. 530) employs as a local application a strong ointment, composed of equal parts of the biniodide of mercury and of a mixture of lard and almond oil. In winter the proportion of oil is increased, in order that the ointment may be liquid, and may spread easily over the skin. The ointment produces intense congestion and redness of the skin, and severe pain. If the parts are covered with cuticle, vesications and pustules are produced, which crust over. If the parts are ulcerated, a thick albuminous secretion is poured out, which forms a crust. When the crusts are detached in five or six days, the lupose tubercles are found to be much reduced in size. Two or three applications of the ointment, at intervals of a week, are sufficient to reduce them to the level of the skin. No unfavourable symptom has been known to be produced by the absorption of the biniodide.

Cazenave also sometimes employs as a local application, Dippel's animal oil, in the place of the biniodide; and these two remedies constitute the only local measures. The cod liver oil is employed internally.

Nipples, Sores of, during suckling. Tincture of Benzoin.—M. BOURDEL (L'Union Méd., Juin) recommends the application of a piece of lint dipped in the tincture placed over the part, then removed, wetted with the tincture, and replaced, so as to cover the ulcer with a layer of liquid. The first application is painful, but the pain seldom lasts more than fifteen minutes; the tincture forms a coating, which the action of sucking does not displace.

Orchitis. Collodion.—Dr. BONNAFONT (Bull. Gén. de Thér., Juin, p. 459) has repeated the observations of Dechange and Costes, and has spread collodion over the scrotum in 56 cases of orchitis. The application gives little, or at most only transient pain, and the effect on the disease is described as marvellous.

Velpeau and Ricord, on the other hand, have found this mode of treatment hurtful. They have known great pain produced by the application, and have found that the disease was not benefited. Instead of collodion, Dr. Puche has employed gelatine.

Phthisis. Oils.—Dr. T. THOMPSON (Lancet, Aug.) has employed various oils in phthisis, in addition to cod liver oil—viz., olive, neatsfoot, cocoa-nut, and sun-

flower. Olive oil is stated to be "almost inert," but the others are more or less useful. Dr. Thompson has used oily inunction with benefit. He also mentions that he has seen cutaneous ulcers much improved by the local application of cod liver oil.

Phthisical Cough.—Dr. T. Thompson (Lancet, Aug.) has found greater benefit from the use of petroleum, or Barbadoes tar, than from any other remedy.

Phthisical Sweating. Oxide of Zinc.—Dr. T. Thompson (Lancet, Aug.) refers in terms of great praise to the effects of oxide of zinc in night sweats, as recommended by Dr. Dickson. Dose, four grains at bedtime.

Pneumonia. Chloroform.—Dr. Stohandl (Schmidt, No. 9, p. 295) relates three pneumonic cases in which, many times, from 30 to 60 drops of chloroform were inhaled, with great benefit, after the manner of Varrentrapp. The pain, the dyspnœa, and oppression, were always relieved for some time (4 to 6 hours), when the inhalation was again resorted to. The author believes that the chloroform acts as a deoxidizing agent on the blood, and lessens its plasticity.

Prurigo.—Dr. Richart (Bull. Gén. de Thér., Juin, p. 524) recommends in prurigo ani et vaginæ, which are often most obstinate complaints, the following "specific" treatment: Take equal parts of sulphate of zinc and of alum, roughly powder them, put them into a glazed earthenware vessel; put it on a slow fire, and leave it there till bubbles of air are no longer disengaged, and till the mixture acquires a stony hardness: then powder it, and throw it by small portions at a time into boiling water, then filter, and apply to the parts with a sponge and on linen.

Rheumatism. Lemon Juice.—In a discussion at the Boston Society for Medical Improvement (Amer. Journ. of Med. Science, July, 1854, p. 83) the effect of lemon juice in rheumatism is alluded to. Three speakers stated that they had used it without effect. One speaker had seen no effect produced on the disease in many cases, while in some benefit was observed. One speaker had found decided benefit in three or four cases.

Chlorate of Potash.—Dr. Sacquet (Rev. Méd. Chir. de Paris, Août) has used this medicine in five cases of acute rheumatism; he gives about 150 to 170 grains in twenty-four hours, and sometimes he has given more than this. The mean duration of the disease after the commencement of treatment was twelve days.

Rheumatism, Chronic. Turpentine Vapour Baths.—Dr. Rey (L'Union, No. 45) has used turpentine vapour baths with great effect in chronic rheumatism, neuralgia, and chronic pulmonary catarrhal affections. The vapour is brought by means of pipes into a room, into which fresh air can be rapidly introduced if necessary. The heat and the amount of turpentine are regulated by circumstances. The flow of sweat is very copious, and the turpentine is also absorbed, and gives the violet odour to the urine. On account of the immense sweating, the baths are very weakening, so that few persons can take more than twelve (on successive days) without leaving them off for some time.

Salivation, Mercurial.—Dr. Norman Chevers (Indian Annals, No. 2, p. 601) recommends in strong terms the use of an iodine gargle, containing two drachms of compound tincture of iodine to eight ounces of water. He states that it is useful both as a prophylactic and as a cure.

Sciatica. Oil of Turpentine.—Vide the latter heading.

Spermatorrhœa. Digitalin.—Drs. Charrier and Homolle (L'Union, Juillet) refer to the good effects of digitalin in several cases of spermatorrhœa treated by them. Dr. Mercier has administered the medicine in "12 or 15 cases" without any marked results, and believes that it is necessary to know more fully all the attendant circumstances, and the cause of the spermatorrhœa, before the exact amount of benefit derived from the digitalin can be determined.

Stricture.—See *Bougie.*

Tetanus. Chloroform.—Encouraged by the effects of chloroform in two cases of tetanus recorded by Drs. V. Dusch and Langenbecks, Dr. Panthel (Henle's

Zeitschrift, Band iv. h. 3) employed it in a severe traumatic case in a strong man, aged 20, who was first treated by bleeding and opium, then by chloroform. The relief given by the inhalation of chloroform (not carried to unconsciousness) was extraordinary, so that the patient could take food, yet in spite of it the spasms returned as severely as if no chloroform had been used, although they were invariably removed when the inhalation was again resorted to; the patient died two days after it was commenced. During the first day of this treatment no less than 6 ounces of chloroform were used, with invariable benefit, and its use was continued till the fatal termination. Although the chloroform was thus unable to save life, the relief it gave to the pain was an immense benefit.

Tinea. Sulphurous Acid.—M. VERHAEGHE (Annales de la Société Méd. Chir. de Bruges, 1854) relates three cases of tinea treated by the local application of sulphurous acid, after the manner of Jenner. In two cases a rapid cure was effected; in the third case there was temporary amelioration, but the disease subsequently returned.

M. BAGIN (Revue Méd. Chir. de Paris, Aout,) has published a memoir on tinea, to show the success of his treatment. This consists in the most careful epilation, and the destruction of the parasitic plant by a solution of the bichloride of mercury, or of the acetate of copper. The details of the treatment are as follows. The hair is first cut close; sulphur lotions and cataplasms to attack the crusts are applied; the solution of corrosive sublimate is then applied so as to kill all the plant on the surface. Then either the hairs are pulled out with pincers, or if the disease be recent and the epilation difficult, the oil of cade, or an alkaline pomade of lime and soda, is rubbed on. When a certain space has been cleared of hair, it is washed with soap and warm water to get rid of fat, and then the parasiticide solution (1 part of corrosive sublimate or of acetate of copper to 100 of water) is immediately applied.

Tumour, Fibrous.—A patient presented a large fibrous tumour of the neck, arising from the transverse processes of the vertebræ. It was of such a size, and had such relations, that ablation was thought impossible. M. MAISONNEUVE (Bull. Gen. de Thér., Aout,) removed it by reflecting the skin, and thereby dividing the tumour into two parts, and dissecting each separately. By this plan (méthode de morcellement) this surgeon has removed large fibrous tumours of the uterus, which could not have been taken out in entire masses.

Turpentine, the Simple and the Ozonized Oil of.—Some very interesting experiments have been made by Dr. SEITZ (Archiv für wissenschaftl. Heilk., Band i. Heft 4; and Schmidt's Jahrb., No. 9), on the comparative action of the simple and the ozonized oil of turpentine. The latter substance is thus prepared:—the common oil of turpentine is placed in white bottles, of which it only fills the half or quarter, and is then freely exposed to sunlight. From time to time the bottle is opened, so that the atmospheric air may have free ingress. The oil thus prepared has the smell and taste of peppermint oil, smelling disagreeably, tasting hot and bitter, and giving to the tongue a peculiar pain and sensation of cold. From experiments on animals, it is found that, on the mucous membrane of the mouth and the digestive organs, the ozonized oil acts like the simple oil; it irritates, and causes an increased flow of saliva and mucus. It is then rapidly absorbed; the pulse increases in fulness and frequency, the respirations are quicker, and when large doses are given, they become even painfully so. If the doses are frequently repeated, inflammations of the endocardium and pericardium, and congestion and hæmoptoic infarctus of the lungs, are caused. Small doses act as excitants to the nervous system, but large doses cause stupor, convulsions, and paralysis. Like the simple, the ozonized oil passes off through the lungs and the kidneys, giving to the breath the smell of the oil, and to the urine the usual violet odour. The quantity of urine is increased. In one case, in a horse, albumen, sugar, and benzoic acid appeared in it. In men, the ozonized oil, in doses of 5 to 15 drops, caused a sensation of coldness on the tongue, and a slight pricking sensation; the saliva was increased; there was a

feeling of warmth in the stomach; the skin became hotter, and the pulse more frequent; the urine had the violet odour, but presented no other change. Applied to the skin, it produced the same effect as the non-oxygenized oil, such as redness and feeling of warmth. The ozonized oil has been given in various diseases with some good effect—viz., in chronic cystitis and in incontinence of urine. In menorrhagia, and in a case of hæmatemesis, it was also useful. But its most decided action was evinced in cases of gouty and rheumatic pains, and especially in sciatica. The dose is 10 to 20 drops on sugar, or in sugar and water, or mixed with honey, or the yolk of egg.

Ulcers. Opium.—In obstinate ulcers, Dr. ROBERTS (Amer. Journ. of Med. Sc., April, p. 417,) speaks highly of the old plan of giving small doses of opium (one-third of a grain three times daily).

Urine, Incontinence of. Digitalin.—M. HOMOLLE (L'Union, Juillet), influenced by the utility of digitalin in spermatorrhœa, has given it in two cases of incontinence of urine, with success.

Variola. Zinc Ointment.—Dr. BENNETT (Monthly Journal,) has used an application of carbonate of zinc, 3 parts oxide of zinc, and 1 part in olive oil, in order to form a crust over the face. When the crust falls off it is renewed. Its effect in preventing pitting is very satisfactory.

MEDICAL INTELLIGENCE.

The Cholera in Barbadoes.

WE have been favoured by Dr. John Davy with the following extract of the letter of a medical friend in Barbadoes. It gives us a very graphic account of the ravages of the disease :—

"The cholera, as you are doubtlessly aware, has visited our little island. Spontaneously, and without our being able to trace its introduction to any importation, it broke out in a very filthy locality of the town (Bridgetown), in the neighbourhood of the bay. At first, that is, for the first week or fortnight, the cases were few, and the matters ejected from the body were not so unequivocally characteristic as to enable the medical men to decide whether the disease was really of the true Asiatic type. As there had been some days previously a large quantity of fish (chiefly flying fish) taken and consumed in a stale and unwholesome condition, it was thought that the malady may have originated from that cause. Moreover, we had a drought protracted to nearly six months, causing great scarcity, and consequently impurity, of water, and an entire extinction of the food usually produced in the island: so that the meal and rice imported from America, at an enhanced price, were the only food of the poorer classes. All these circumstances combined, made those who had to deal with the disease hope that the island might have yet been spared the horrors of a visit from the Asiatic cholera. All these hopes were soon to be disappointed. In a very short time it broke out simultaneously in various parts of the town, and spread with great rapidity; exhibiting a malignity which, I believe, has never been surpassed in any part of the world. In four weeks from the time when the disease left no doubt of its real nature, it attacked about ten thousand persons, half of whom died. From the town it proceeded to the vicinity, where the mortality was awful; over two hundred of the soldiers of the garrison died. Whilst this work of slaughter was going on in the town, it commenced its ravages all round the sea coast, beginning at Bathsheba and the opposite coast of Christchurch, two of the healthiest spots in the island. It thus embraced the whole of the outskirts of the island, and gradually spread into the interior, where it still lingers, leaving one little spot, comprising about five or six estates in one neighbourhood, as yet unscathed. It is now (July 11th) exactly eight weeks since the first person died, and, as far as can be ascertained, ten thousand persons throughout the island have died of the pestilence. At first, it seemed to be con-

fined to the haunts of filth and destitution, attacking some of the more wretched negroes about the town, the very refuse of society; but it has since carried off many respectable families, sweeping many houses clean of their inhabitants, and causing in others a vast amount of widowhood and orphanage. We hope it is taking its departure from among us, as there is a great abatement of deaths, but they still amount to a great many. The greatest exertions have been made to mitigate the evil. With an energy quite characteristic of the inhabitants of this island on occasions of urgency, every man has done his best to alleviate the general distress. The legislature have placed the treasury at the disposal of the executive, for the relief of the sick and needy. In an incredible short time, an organized system for the distribution of wholesome, nutritious food, and medicine and medical aid, and furnishing the means of interment, has been established in the town and the country parishes; and every one who could render assistance, has rendered personal service and pecuniary aid. I am thankful to say, that we have been able to bury our dead, so that they have not been left to be exposed on the earth to add to the contamination of the atmosphere, and to shock the feelings of the survivors. The weather has been remarkably fine during the prevalence of the epidemic, nice refreshing showers and sweet balmy breezes; indeed, the whole appearance of nature, the verdant fields, and the rich and beauteous foliage of the trees, occasioned by the late rapid spring, have contrasted widely with the poisoned atmosphere and its deadly influence. The awful mortality which has prevailed; the rapidity with which many persons whom we knew have been hurried to an untimely grave; the work of interment amounting for many days in succession to the inhumation of nearly three hundred corpses in one burial-ground alone, and on one day exceeding that number; the intractable nature of the disease sweeping off many of its victims without any premonitory warning, and affording no hopeful reliance on any especial mode of treatment; its mysterious origin and capricious movements, now apparently creeping in one direction, in another moment bursting out with terrific violence in another, its proximity to our own dwelling; all these circumstances have impressed our minds with awe, and made us feel the solemnity of our position. I see by one of the local newspapers, that the loss of life up to the present time is estimated, as far as data for calculation can be relied on, at twelve thousand persons."

According to the latest accounts from the West Indies, it has amounted to seventeen thousand, in a population of about one hundred and thirty-six thousand, or nearly twelve per cent.

The late General Board of Health.

The cholera epidemic of 1849 called into being the General Board of Health, which, after five years of a harassed existence, has ceased to exist. We have had occasion in this journal to review the purely medical action of this Board, and now we do not like to let it disappear without a few words at parting. It has disappeared almost in ignominy, while from its ashes a young phœnix has sprung up. But we are convinced that, great as were some of the errors of the old Board, and unmeasured as has been the obloquy heaped upon it, its career of usefulness will not easily be surpassed. At present its services are undervalued, and the extent of its working is misunderstood. We can say this with the better grace, because we have most freely expressed our opinions when, in the matters of quarantine and the like, the old Board had adopted opinions which we believed to be dangerous and untrue.

But such errors as these should not blind us to the facts, that the late Board of Health has succeeded in wonderfully popularizing and making familiar to the nation the grand principles of National Health. How long these principles have been proclaimed by medical philosophers, our readers know as well as we do. How long, without the Board of Health, they would have remained mere medical doctrines, applied only occasionally and incidentally, we can form a pretty good opinion, since, for a century, they have been cried in the street, and no man has

regarded them. The Board of Health diffused them through the length and breadth of the country, and the very enthusiasm with which the action of the present Board is greeted is a testimony to the tuition which their predecessors have given to the public mind.

In the matter of cholera especially, the late Board acted with a vigour and judgment which cannot well be surpassed. While they put into force the very weak powers which they had obtained from the Legislature, in the form of the Public Health and the Nuisance and Diseases Prevention Acts, they organized, at short notice, a wide system of medical relief, and they seized, with a kind of instinct, on the only point in the treatment of cholera, a knowledge of which could be useful to the public at large. We refer of course to the stress which the Board laid on the importance of checking the so-called premonitory diarrhœa, a cardinal point of the most vital importance. We are sorry to see that in this respect the present Board has somewhat abandoned the path chosen by their predecessors. The reason of this we do not know; but we are certain that, in spite of the late encomiums on purgatives in cholera, no other rule of treatment in cholera is of equal importance.

In other branches of state medicine, the action of the Board was less effectual. But even in the abortive schemes for extramural interment, and for water supply, we are not certain that the opposition the Board encountered is not rather to blame for the failure, than any defect in the plans proposed. Possibly, both plans were on too extensive and colossal a scale, and more modest and less radical measures might have been successful. Before, however, we condemn the principles on which the late Board of Health acted, we must see what their successors will do. We shall be surprised if, to a certain extent, they have not to tread over the same ground.

While justice demands from us this expression of opinion respecting the services of the late Board towards sanitary reform, we are far from wishing to disparage the actions of the present Board. On the contrary, with the exception above referred to, there is not one of their measures, as far as they are known, which does not seem well planned. The establishment of a Medical Council, and the appointment of scientific gentlemen to investigate the recondite phenomena of cholera, are both most commendable arrangements. We must express our hope, however, that if, as appears likely, the medical organization thus called into play is not in time to efficiently examine the problems connected with the spread and treatment of cholera, it may not be at once disbanded We are by no means secure from another epidemic; but were such an occurrence unlikely, there are numerous inquiries connected with the public health which can be investigated only by such appliances as the Board of Health has now set in action. That which has originated in a temporary emergency, ought to, and must, become a permanent and active institution.

The Composition and Effect of Copper Smoke.

UNDER the somewhat quaint, but expressive title, "Industrial Pathology," several important works have been commenced, which will doubtless throw great light on the diseases which their various occupations produce in artizans. Dr. T. K. Chambers has read before the Society of Arts a very interesting paper on the subject, and is now engaged in collecting materials for further elucidating this inquiry. We have little doubt, that with the assistance of the Society, and of those members of the profession who are cognizant of the habits and processes of various trades, Dr. Chambers will be able to contribute some valuable facts to this department of public health.

Another addition to "Industrial Pathology" has just been made by Dr. Thomas Williams, of Swansea, a gentleman whose name is familiar to our readers as one of the most philosophical and hard-working physicians of the day. At the request of the late Board of Health, Dr. Williams has instituted a most careful inquiry into the composition of the "copper smoke" which floats thickly over the valley

of Swansea, and into the effects which the inhalation of this atmosphere has upon animals and men. For the last one hundred and fifty years this district has been noted for its copper mines, but now the operations carried on have assumed a gigantic scale. Half the copper smoke produced in the world ascends from this locality, and the dense clouds spread themselves around over a space which has a circumference of fifteen miles. As the smoke issues from the furnaces, it is found by Dr. Williams to contain both arsenic and metallic copper, but in the smoke at some little distance from its place of production, neither of these metals, nor any compounds derived from them, can be discovered. Nor can any arsenic be found in the water at some little distance, nor in the herbage. Arseniuretted hydrogen, which is formed at some stages of the smelting, appears to be decomposed before the smoke issues from the chimney. Two great and constant ingredients of the "copper smoke" are sulphuric and sulphurous acids; the latter acid can be detected at a great distance from the works; it is washed down with the rain, and destroys the herbage. Pure sulphur, and minute quantities of hydrofluoric and fluo-silicic acids are also found in the smoke, mixed, of course, with large quantities of coal smoke. Such are the ingredients of the "copper smoke," as determined by Dr. Williams. The important inquiry now presents itself, as to what are the effects produced on the inhabitants around the works. It is certain that vegetation is greatly injured, and that the productive power of the land has diminished within the memory of many still living. The larger kinds of trees and fruit trees have been completely destroyed; while, singularly enough, some flowers, such as dahlias and chrysanthemums, are uninjured. So pernicious is the effect on agriculture, that a celebrated action was brought, thirty-one years ago, by the neighbouring farmers against the owners of the largest copperworks. Agriculture, however, did not carry the day.

The effect of the copper smoke on cattle has been greatly discussed. It seems certain that cattle do suffer from a peculiar affection, which is popularly called the "smoke disease." In this complaint the animals do not eat, but blow on the smoky grass, the joints crackle, the coat stares; cows lose their milk. In an advanced degree the bones are affected, and become brittle, exostoses form, and teeth drop out. There are not wanting persons who deny that this disease is peculiar to the smoke district; but Dr. Williams, after an elaborate survey of all the arguments, expresses his opinion that "it is a specific copper smoke disease." He also is inclined to attribute it to the sulphurous acid, and thinks, moreover, that it is the acid which has passed into the food, and not that inhaled in the air, which causes it.

With respect to man, the influence of the copper smoke is less decided, because the artizan is exposed to many other influences, the effect of which cannot be well eliminated. Dr. Williams examines successively all these agencies, and arrives at the conclusion, that owing to compensating causes, the life of the copper smelter, laborious as it is, is not so deleterious as might be imagined. On the contrary, with the exception of bronchitis, those men are very healthy. Typhus and skin diseases are especially rare.

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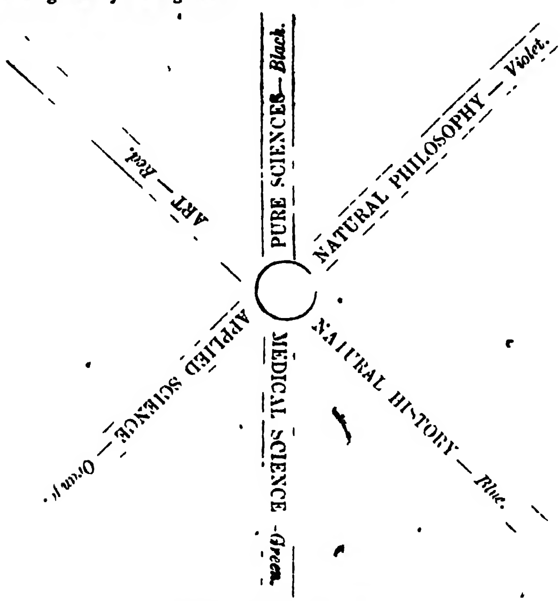

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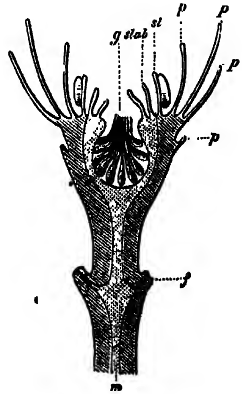
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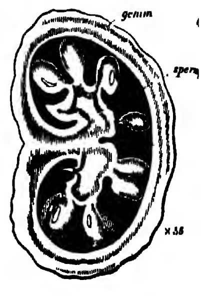
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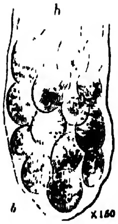
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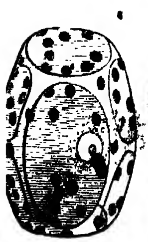

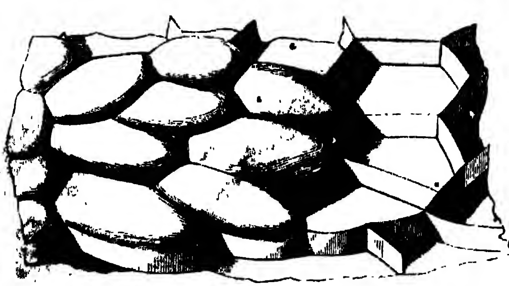

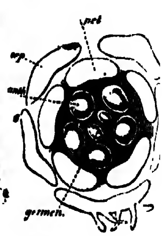
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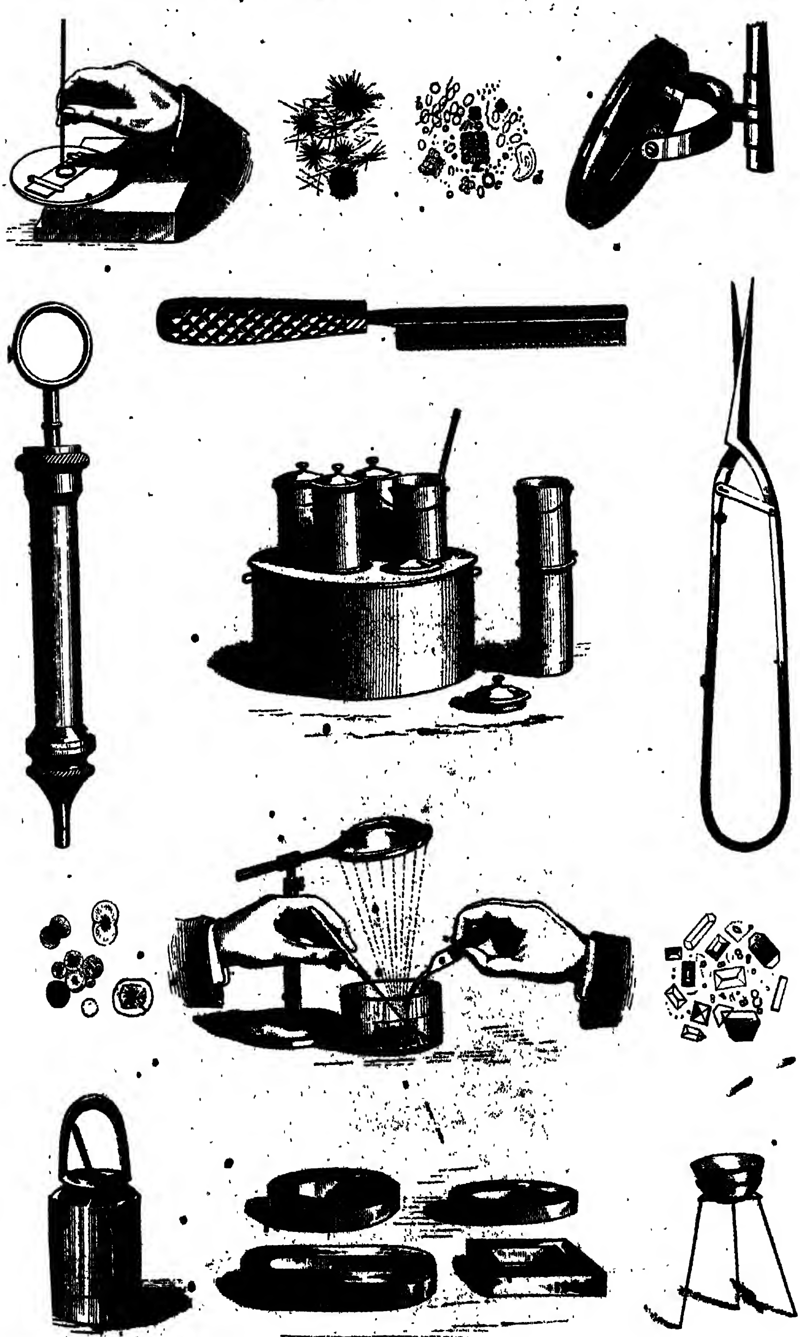

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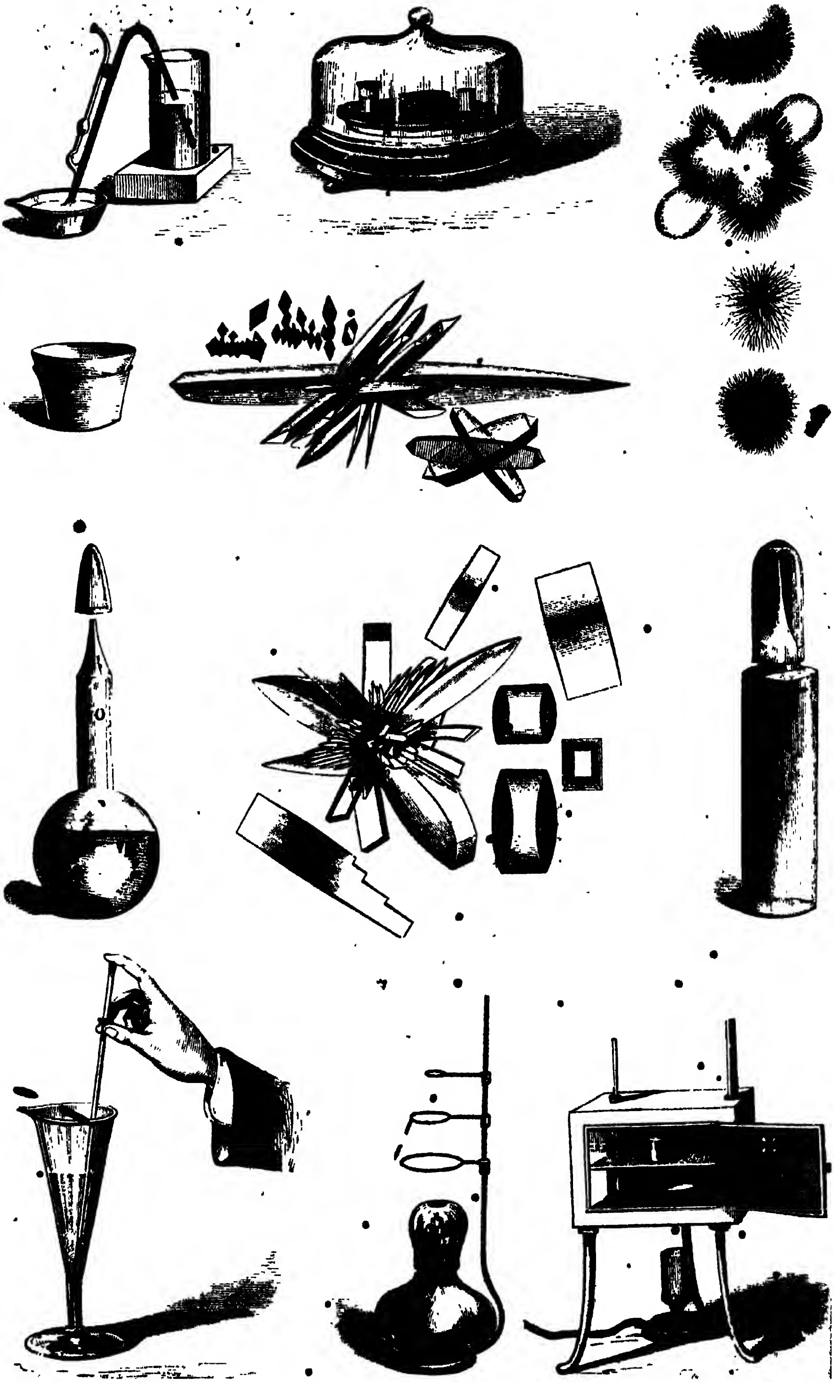

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1. Rock Crystal. 2. Common Quartz. 3. Rose Quartz. 4. Amethyst. 5. Chrysoprase. 6. Agate. 7. Eisenkiesel. 8. Jasper. 9. Opal. 10. Hyalite. 11. Feldspar. 12. Albite. 13. Pitchstone. 14. Obsidian. 15. Pumice. 16. [illegible]. 17. Nepheline. 18. Chiastolite. 19. Wavellite. 20. Alum Stone. 21. Hauyn. 22. Analcime. 23. Natrolite. 24. Stilbite. 25. Apophyllite. 26. Chabasite. 27. Harmotome. 28. Mica. 29. Chlorite. 30. Talc. 31. Schillerspar. 32. Actinolite. 33. Hornblende. 34. Tremolite. 35. Augite. 36. Bronzite. 37. [illegible]. 38. Asbestus. 39. Porcelain Clay. 40. Polierschiefer. 41. Fullers' Earth. 42. Bole. 43. Kerolite. 44. Common Garnet. 45. Pyrope. 46. Vesuvian. 47. Pistazite. 48. Zoisite. 49. Cyanite. 50. Rhætizite. 51. Andalusite. 52. Zircon. 53. Spinell. 54. Topaz. 55. Beryl. 56. Dichroite. 57. Tourmaline. 58. Olivine. 59. Lievrite. 60. [illegible]. 61. Calcspar. 62. Brown Spar. 63. Pea Stone. 64. [illegible]. 65. Arragonite. 66. Fluorspar. 67. Apatite. 68. Heavy Spar. 69. Celestine. 70. Gypsum. 71. Rock Salt. 72. Sparry Iron. 73. Calamine. 74. Blue Copper. 75. Malachite. 76. Uranite. 77. Carbonate of Lead. 78. Pyromorphite. 79. Phosphate of Iron. 80. Magnetic Iron. 81. Specular Iron. 82. Red Hematite. 83. Brown Hematite. 84. Tin Stone. 85. Wolfram. 86. Titanite. 87.

Grey Manganese. 88. Red Copper Ore. 89. Native Silver. 90. Native Copper. 91. Iron Pyrites. 92. Mispickel. 93. Stream Tin. 94. Copper Pyrites. 95. Galena. 96. Molybdenite. 97. Grey Antimony. 98. Zincblende. 99. Sulphur. 100. Asphalt.

Size, 2 inches by 2 inches, 1*l.* 5*s.*—3 inches by 3 inches, 2*l.*

52. 100 ROCKS, same as collection 48.

53. 100 FOSSILS, viz.:—

No. 1-4. From Alluvium and Diluvium Deposits. 5-28. From the Tertiary Formation. 29-48. From the Chalk and Greensand. 49-70. From the Jura and Lias. 71-80. From the Trias. 81-90. From the Permian and Carboniferous. 91-100. From the Devonian and Silurian. 1*l.* 16*s.*

54. EMIGRANT'S COLLECTION, comprising 111 Specimens of those Minerals and Rocks most worthy of notice in Foreign Countries, either for their own value or for their *indications* of Mineral Wealth.

ROCKS.—Granite, coarse and fine grained, Syenite, Hornblende Rock, Porphyre, Basalt, Greenstone, Serpentine, Trachyte, Obsidian, Lava, Quartz Rock, Itacolumite, Puddingstone.—*Slates, &c.*: Mica Schist, Gneiss, Chlorite Slate, Clay Slate, Silurian and Devonian Slate, Coal Shale, with fossil plants, Lias Shale, Lithographic Slate.—*Sandstones*: Ferruginous, Calcareous, pure Sandstone.—*Limestones*: Metamorphic Limestone; Silurian and Devonian, with Trilobites, &c.; Magnesian and Carboniferous Limestone with Spirifers and Productus; Lias and Oolitic Limestone; Chalk, white and black; Tertiary Limestone with fossils; Fresh-water Limestone; Travertine. —*Clays*: Blue Clay, Pipe-clay, Marl or Fullers' Earth, Porcelain Clay.

MINERALS.—*Minerals at times mistaken for Gold*: Yellow Mica, Crystals of Iron, and Copper Pyrites.—*Ores*: N. Gold; N. Silver, Sulphuret of Silver; Amalgam, N. Mercury, Cinnabar; Platinum; N. Copper, Oxide of Copper, Blue and Green Carb. of Copper, Massive Copper Pyrites, Gray Copper; Oxide of Iron, red and brown, Magnetic Oxide of Iron, Ironstone, Carb. of Iron, Massive Iron Pyrites; Galena, Carb. of Lead; Zinc Blende, Calamine; Oxide of Zinc, Tin Pyrites; Copper Nickel, Native Arsenic, Realgar, Orpiment; Oxide of Manganese, Arsenical Cobalt, Native Bismuth.—*Useful Minerals*: Sulphur; Graphite; Anthracite, Coal, Brown Coal; Feldspar; Talc; Mica; Alumstone; Gypsum; Nitre; Iceland Spar; Emery; Strontianite; Barytes; Amber; Asbestus; Fluor Spar; Dolomite.—*Gems*: Rock Crystal; Beryl; Topaz; Sapphire; Ruby; Hyacinth; Garnet; Tourmaline; Turquois; Zircon; Chrysolite; Idocrase.

Size, 1 inch square, 18*s.*; 4 in. sq. 1*l.* 10*s.*

55. METALLURGICAL COLLECTION, comprising 140 specimens of the principal Minerals used for the extraction of the most important Metals, viz.:

Meteoric Iron, Magnetic Iron Ore, Specular Iron, Iron Mica, Red Hæmatite, fibrous and compact, Brown Hæmatite, fibrous and compact, Lepidokrokite, Stilpnosiderite, Clay Ironstone, Bog Iron Ore, Blue Iron Ore, Iron Pyrites, White Iron Pyrites, Magnetic Iron Pyrites, Arsenical Pyrites, Arsenical Iron, Carbonate of Iron, Sphærosiderite, Lievrite, Titaniferous Iron, Franklinite, Chrome Iron Ore, Tungstate of Iron.—Native Copper, Red Oxide of Copper, Black Oxide of Copper, Sulphuret of Copper, Bournonite, Purple Copper, Copper Pyrites, Grey Copper, Blue Carbonate of Copper, Malachite, Arseniate of Copper, Silicate of Copper.—Smaltine, Black Oxide of Cobalt, Arseniate of Cobalt.—Copper Nickel, Nickel Pyrites, Green Oxide of Nickel.—Oxide of Tin, Wood Tin, Tin Pyrites.—Red Oxide of Zinc.

Zinc Blende, Calamine, Silicate of Zinc, Willemite;—Native Bismuth, Sulphuret of Bismuth;—Oxide of Antimony, Sulphuret of Antimony, Arseniuret Antimony, Native Arsenic, Realgar, Orpiment, Native Mercury, Cinnabar;—Mangan [illegible], Seleniuret of Lead, Boulangerite, Carbonate of Lead, Sulphate of Lead, Chromate of Lead, Phosphate of Lead, Foliated Tellurium;—Cerite, Orthite;—Tantalite, Yttrotantalite;—Rutile, Titanite;—Tungstate of Lime;—Molybdenite, Molybdate of Lead;—Pyrolusite, Manganite, Braunite, Manganese Psilomelane, Silicate of Manganese;—Native Silver, Amalgam, Vitreous Sulphuret of Silver, Brittle Sulphuret of Silver, Red Silver, Chloride of Silver;—Native Gold, Native Platinum;—Osmium-Iridium. . . Size 2 inches by [illegible], [illegible]; 3 inches by [illegible] 5l

59. CABINETS OF MINERALS FOR [illegible] in fine pasteboard cases . . 9s to [illegible]

58. Collections of Gems in their natural state, 50 species and varieties . 5l

A COLLECTION OF GLASS MODELS OF GEMS, to illustrate

60. Section I.—The crystalline forms and colours of the principal Gems, viz., Diamond, Sapphire, Ruby, Chrysoberyl, Spinel, Emerald, Topaz, Garnet, Amethyst, Chrysolite, Zircon, Tourmaline, &c.
Size, [illegible] inch by [illegible] inch [illegible]

61. Section II.—The principal forms into which gems are cut, viz. Lasque, Rose, Single Cut, Brilliant, Lisbon, Trap Cut, Cabochon . . . 2l 2s

62. Section III.—The gems in their cut state . . . . . [illegible]

63. Portable Lapidary's Apparatus for cutting and polishing Minerals, &c., complete, with the necessary materials and directions for use
7l 7s, 8l. 8s, 10l 10s

PALÆONTOLOGY.

COLLECTIONS OF SPECIAL CLASSES OF FOSSILS.

	[illegible]	A. [illegible]	B. [illegible]	C. [illegible]	D. 100	E. 150	F. 200	G. 300	H. 500
		£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£
78.	Plants, fruits, &c.	5 0	12 [illegible]	[illegible]	[illegible]	[illegible] 15	5 0	11 [illegible]	..
79.	Infusoria . . .	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	..	..	..
80.	Zoophytes . . .	[illegible] 5	0 17	[illegible] 10	3 15	[illegible] 10	..	..	..
81.	Echinodermata	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	..	..	..
82.	Mollusca . . .	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6 0	10 0	20
83.	Cephalopoda . .	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 10	9 0	15 0	..
84.	Articulata . .	[illegible]	[illegible]	[illegible]	[illegible]	12 0	..	..	..
85.	Trilobites . .	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	..	..	..
86.	Fishes . . .	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	..	..	..
87.	Reptilian remains	15	2 [illegible]	[illegible]	[illegible]	[illegible]	..	..	..
88.	Mammalian remains	10	1 [illegible]	[illegible]	[illegible]	[illegible]	..	..	..

COLLECTIONS OF FOSSILS FROM THE DIFFERENT FORMATIONS.

	Species.	L. 25.	M. 50.	N. 100.	O. 150.	P. 200.	Q. 300.	R. 400.	S. 1000.
		s.	£ s.	£ s.	£ s.	£ s.	£	£ s.	£.
89.	Alluvium and Diluvium	10	1 5	..	..	..	..	..	..
90.	Tertiary	10	1 0	2 5	3 15	5 15	10	14 0	40
91.	Cretaceous	10	1 0	2 10	[illegible]	6 0	10	13 10	..
92.	Wealden	15	2 0	..	..	..	..	..	..
93.	Oolite	10	1 0	2 5	3 15	5 15	10	14 0	} 45
94.	Lias	10	1 0	2 10	4 0	6 0	10	..	
95.	Trias	15	2 0	4 15	8 0	12 10	..	..	..
96.	Permian	15	2 0	5 15	..	..	..	..	..
97.	Carboniferous	10	1 0	2 5	4 0	6 0	..	..	..
98.	Devonian	10	1 5	3 0	5 5	8 0	14	20	..
99.	Silurian	12	1 5	3 0	5 10	9 0	15	22	..

CASTS OF RARE FOSSILS.

Persons wishing to purchase these Casts can be furnished with two engravings representing most of them.

		£	s.	d.
150.	Mastodon giganteum, Pl. II. fig. 6. Lower jaw perfect; 2½ feet long, from the diluvium of the Missouri River. The original is in the Royal Museum at Berlin.	1	5	0
151.	Megalonyx Jeffersoni, Harlan. Four different bones; femurs, phalanges, &c., from the same locality	0	6	0
152.	Gulo spelaeus, Goldfuss. A perfect head; from the Gailenreuth caves. The original in the Museum of Bonn.	0	5	0
153.	Elephas primigenius, Blumenbach. Perfect lower jaws, with teeth, of a young animal, from the River Lippe, Westphalia. The original in the Museum of Bonn.	0	7	6
154.	Zeuglodon hydrarchos, Carus. The most perfect head ever found, 3 feet in length; skull and lower jaws well preserved; from the Eocene beds of Alabama. The original in Dr. Krantz's Museum.	4	10	0
155.	Zeuglodon cetoides, Owen; Basilosaurus Harlan; Hydrarchos, Koch. Two teeth, from the Eocene group of Alabama	0	3	0
156.	Sphærulites calceoloides, Desmoulins. Figured in Part IV. of the Mém. de la Société de France. The original belonging to Dr. Krantz.	0	8	0
157.	Iguanodon, Hylaeosaurus and Gavial. Fourteen different bones, from the Weald clay of Sussex, England. The originals are in the British Museum.	1	0	0
158.	Pterodactylus crassirostris, Goldf., Pl. II. fig. 7. Two pieces from the lithographic slate of Bavaria. The original is in the Museum of Bonn.	0	12	0
159.	Mystriosaurus longipes, Pl. II. fig. 8. Perfect skeleton from the Wurtemberg Lias. The original is in the Imperial Museum at Vienna.	1	10	0

160. Mystriosaurus [illegible]. Pl. II., fig. [illegible]
Head of a small [illegible] specimen, from the same place.
The original is in the Royal Museum at Berlin.
161. Ichthyosaurus platyodon, Pl. II., fig. [illegible]
Perfect head of a skeleton [illegible]
162. Vertebrae of the same specimen, Pl. II., fig. [illegible]
163. [illegible] Pl. [illegible] fig. [illegible]
Head, thorax, [illegible] perfect.
164. Ichthyosaurus [illegible] Pl. [illegible] fig. [illegible]
Perfect head.
Originals of [illegible] in Dr. Krantz's Museum.
165. Ichthyosaurus [illegible] Pl. II., fig. 1.
[illegible] Wurtemberg [illegible]
The original is in the Imperial Museum at Vienna.
166. Plesiosaurus dolichodeirus, Cony. Pl. [illegible], fig. 2.
Skeleton, perfect, [illegible] long, from the Lias shales of Glaston-bury in Somersetshire.
The original in the British Museum.
167. Plesiosaurus, new species. Pl. II., fig. 11.
Head, perfect, from Boll, Wurtemberg.
The original in Dr. Krantz's Museum.
168. Pentacrinus subangularis. Pl. II., fig. [illegible]
The best known specimen [illegible] feet long; same locality.
The original in Dr. Krantz's Museum.
169. Labyrinthodon. Pl. I., fig. 3.
Head, perfect, from the Keuper coal beds at Gaildorf in Wurtemberg.
The original in the Museum at Stuttgart.
170. Pistosaurus longaevus, H. von Meyer. Pl. II., fig. 12.
Head, from the Muschelkalk at Bayreuth, Bavaria.
The original in the Royal Museum at Berlin.
171. Nothosaurus mirabilis, Münster.
Perfect upper head, from the Muschelkalk of Bayreuth.
The original in Dr. Krantz's Museum.
172. Placodus [illegible] Münster.
Head, from the Muschelkalk of Bayreuth.
The original in Dr. Krantz's Museum.
173. Protorosaurus Speneri. Pl. II., fig. 11.
Vertebral spine and extremities, from the cupriferous slate of Rothenburg.
The original in the Royal Museum.
174. Archegosaurus [illegible], Goldfuss.
Head from the coal measures of Saarbrück.
The original in Mr. [illegible]'s Collection.
175. Several species of Trilobites, remarkable for [illegible] or beauty, such as [illegible] Pl. [illegible] figs. 13 and 14, each [illegible].

NOTICE.

As Mr. Highley has [illegible] [illegible] between [illegible] and [illegible] [illegible] are con[illegible] to [illegible] between the various parcels according to [illegible] [illegible] each packing case.

The [illegible] Dr. Krantz's [illegible] Catalogue of Mineralogical, Geological, [illegible] price 1s., whose List of [illegible] more than 400 localities, and [illegible] stock of about [illegible] Specimens, un-

rivalled by any known private collection, and representing the state of the Science at the very latest date, with its most recent discoveries. From the extensive nature of his establishment, Dr. Krantz is enabled to offer specimens *on very moderate terms*, the difference in price depending chiefly on the locality, size, or beauty.

Of Rock Specimens about 1000 varieties are in stock, constituting a complete series of all the primary, volcanic, and sedimentary rocks which form the known solid part of our globe. All the Specimens of each Collection are of the same size and shape, so as to admit of being arranged in an elegant manner, without unnecessary waste of room in drawers or cases. Each Specimen is accompanied by a printed ticket, with the English, French, and German names and localities. The Prices vary according to the size of the Specimens, viz.:—Three inches square 3*d.* to 9*d.*; four inches square 6*d.* to 1*s.* each.

Of Fossil Organic Remains on hand, the number of species amounts to about 8000, collected from the principal localities of Europe and the United States. All these species are carefully determined. Each specimen is furnished with a printed label indicating the name, geological formation, and locality. The Collections are generally arranged stratagraphically, but zoological classifications are adopted when required; or any special Treatise on Geology, &c., may be illustrated.

***** Collections to illustrate Special Mineralogical Subjects, Processes, Manufactures, &c., may be made up to order.**

BOTANY.

COLLECTIONS, ETC., TO ILLUSTRATE THE PRINCIPLES AND ELEMENTS OF BOTANY *in preparation.*

ECONOMIC BOTANY.

COLLECTIONS TO ILLUSTRATE THE VEGETABLE PRODUCTS USED IN COMMERCE.

In these Collections each specimen is accompanied by a label, giving the commercial name, scientific name, native name, whence imported, uses, statistics of imports.

903. COLLECTION OF SIX NUTS OF COMMERCE, viz.—

Litchis, Souari or Surahwa Nut, Cashew Nut, Pecan Nut, Black Walnut or Hog Nut, Vegetable Ivory or Corosso Nut; in divisional glazed box.

907. COLLECTION OF TWELVE VEGETABLE FIBRES USED FOR TEXTILE FABRICS. viz.—

Dutch Flax, Bombay Flax, Polish Ryne Hemp, White Crown Marienburg Hemp, Bombay Hemp, Italian Garden Hemp, Jute Hemp or Jute, Sun Hemp, Manilla Hemp, Coir Yarn, China Grass, Piassava or Piacaba.

908. COLLECTION OF TEN TANNING MATERIALS, viz.—

Cork-tree Bark or Alcornoque, Valonia Camata (Young-Valonia), Savanilla Divi-Divi, Maracaibo Divi-Divi, Rio de la Hache Divi-Divi, Pi-pi, Bombay Cutch, Terra Japonica, Pegu Cutch.

909. Collection of Ten Dyeing Materials, viz.—

Madder Root, Turmeric, Quercitron Bark, Safflower, Yellow Berries, Shumac, Orchella Weed, Myrabolams, Galls (excrescences produced by gall insect, Cynips querci, on the oak), Indigo Lac Dye, Alkanet Root.

920. A Collection of 100 Sections of Woods, used in commerce mounted on perforated paper in box . . . . 1*l.* 5*s.*

ZOOLOGY.

COLLECTIONS TO ILLUSTRATE THE PRINCIPLES AND ELEMENTS OF ZOOLOGY.

OSTEOLOGY.

BIMANA.

1001. Human Skeletons, Male or Female, unarticulated . from 3*l.* 3*s.*
1002. Human Skeletons, articulated with brass . . . from 6*l.* 6*s.*
1003. Human Skeletons, articulated, &c., with vulcanized India-rubber, from 8*l.* 8*s.*

*** *This novel mode of mounting skeletons is particularly recommended, as it allows of all the bones being readily separated for the purpose of examining the articulating surfaces.*

1004. Skeleton Stands on rollers, with pulleys and counterpoise weights, from 1*l.* 11*s.* 6*d.*
1005. Human Skulls . . . . from 1*l.* 1*s.*
1006. Human Skulls, disarticulated, in box, *first quality* . 1*l.* 11*s.* 6*d.*
" " " *second quality* . . 1*l.* 5*s.*
1007. Human Skull, with horizontal and vertical section, showing the maxillary and frontal sinuses, &c., in box . . . . . 2*l.*
1008. Human Skulls, very carefully dissected to show all the sinuses and the anatomy of the internal ear, &c., in box . . . 3*l.* 3*s.*
1009. Collection of Fourteen Dissections of the Temporal Bone, showing different sections of the Internal Ear, with preparation of the Nerves and Arteries, under glass shade . . . . 10*l.*
1010. Collection of Twenty-five Preparations to illustrate Human Dentition, from the Fœtus to Manhood, with two Preparations of the Veins, Arteries, and Nerves . . . . 30*l.*
1011. Collection of Ninety Preparations to illustrate Comparative Dentition from Man to the Insect, each mounted separately on metal support and black stands . . . . 68*l.* 5*s.*
1012. Skulls, dissected to show the Primary and Secondary Dentition, mounted under glass shade . . . . 3*l.* 3*s.*
1013. Bones of the Vertebral Column, unarticulated . . . . 12*s.* 6*d.*
1014. Vertebral Column, articulated with vulcanized India-rubber and intervertebral substance, in box . . . . 1*l.* 1*s.*
1015. Pelvis, with Coccyx, Male or Female . . . . . 10*s.* 6*d.*
1016. Scapula, Clavicle, Humerus. Ulnar, and Radius, bones of the Wrist Joint and Hand, articulated with vulcanized India-rubber, in box 1*l.* 11*s.* 6*d.*

1017. Os-Innominata, Femur, Patella, Tibia, and Fibula, bones of the Ankle-joint and Foot, articulated with vulcanized India-rubber, in box . . . . 1*l.* 11*s.* 6*d.*
1018. Bones of the Hand and Wrist-joint, articulated with brass wire 5*s.* 0*d.*
1019. Bones of the Hand and Wrist-joint, articulated with cat-gut . 7*s.* 6*d.*
1020. Bones of the Hand and Wrist-joint, articulated with vulcanized India-rubber, in box . . . . 10*s.* 6*d.*
1021. Bones of the Feet and Ankle-joint, in the various manners and at the same prices as Nos. 1018, 1019, 1020.

*** *See also Midwifery and Embryology for Fœtal Skeletons and Pelvis.*

COMPARATIVE OSTEOLOGY.

Articulated Skeletons from the different classes of animals, can generally be supplied, but as the SPECIES depends upon the opportunity of purchase, Curators of Museums, and others, interested in Comparative Anatomy, are requested to intimate the particular species they require, and to forward their names to Mr. S. Highley, that they may be duly informed of every addition to his Collection. The range of prices is given in the annexed list as a guide to Collectors.

MAMMALIA.

Quadrumana	from 1*l.* 16*s.* to 25*l.*
Carnassores	from 12*s.* 6*d.* to 20*l.*
Marsupialia	from 2*l.* 12*s.* 6*d.* to 20*l.*
Rodentia	from 1*l.* 1*s.* to 20*l.*
Edentata	from 9*l.* 9*s.* to 30*l.*
Pachydermata	from 2*l.* 10*s.* to 50*l.*
Ruminantia	from 3*l.* 13*s.* 6*d.* to 20*l.*
Cetacea	from 3*l.* 3*s.* to 30*l.*

AVES.

Accipitres	from 15*s.* to 9*l.* 9*s.*
Passerinæ	from 12*s.* 6*d.* to 15*s.*
Scansores	from 17*s.* 6*d.* to 1*l.*
Gallinæ	from 12*s.* 6*d.* to 2*l.* 11*s.* 6*d.*
Grallæ	from 15*s.* to 30*l.*
Palmipedes	from 1*l.* to 5*l.* 10*s.*

REPTILIA.

Chelonia	from 1*l.* to 3*l.* 3*s.*
Sauria	from 1*l.* 1*s.* to 21*l.*
Ophidia	from 1*l.* 1*s.* to 36*l.* 15*s.*
Bactrachia	from 5*s.* to 3*l.*

PISCES.

Acanthopterygii	from 1*l.* to 5*l.*
Malacopterygii Abdominales	from 1*l.* to 3*l.*
Malacopterygii Subbrachiati	from 1*l.* to 5*l.*

Malacopterygii Apoda	from 1*l.* 5*s.* to 2*l.* 10*s.*
Lophobranchii	from 1*l.* to 1*l.* 10*s.*
Plectognathi	from 1*l.* to 8*l.*
Chondropterygii Branchiis Fixis .	from 1*l.* 10*s.* to 2*l.* 10*s.*

ART—ANATOMY.

MODELS TO ILLUSTRATE THE STUDY OF ANATOMY IN ITS APPLICATION TO ART.

_ *See also Osteology.*

1031. AN ANATOMICAL STATUETTE, exhibiting the External Muscles of the Human Body. Carefully modelled, and expressly adapted for the use of Artists, and others interested in the study of Anatomy. Height, 27 inches. Accompanied by a KEY, containing Outline Views of the Statuette in its several aspects, with reference to the Names of the Muscles 15*s*

1032. The same, carefully coloured . . . . 1*l.* 10*l.*

_ *Packed in a Case for the Country, 4s. extra.*

1033. Life-size Model, showing the External Muscles of the Head and Neck on one side, and Bones of the Skull on the other; carefully coloured, on stand . . . .

1034. Life-size Model of the External Muscles of the Hand and Arm, coloured; on stand . . . .

1035. Life-size Model of the External Muscles of the Foot and Leg, coloured; on stand . . . .

ANATOMY AND PHYSIOLOGY.

1042. A dissecting model in wax of the human brain, *in situ*, under glass shade . . . . 5*l.* 5*s.*

1043. An enlarged dissecting model in wax of the Medulla oblongata, under glass shade . . . . 3*l.* 3*s.*

CONCHOLOGY.

COLLECTION OF BRITISH SHELLS.

	£.	s.	d.
100 Species, containing several of each species	2	12	6
200 Ditto	6	6	0
300 Ditto	12	12	0

MEDICAL SCIENCE.

MIDWIFERY.

EMBRYOLOGY.

1501. Model in wax of Male Genito-Urinary Organs, in glazed case 2*l.* 2*s.*
1502. Model in wax of Female Genito-Urinary Organs, in glazed case 5*l.* 5*s.*
1503. Collection of Nine Models in wax, showing the Stages of Human Gestation . . . . 9*l.* 9*s.*
1504. Model in wax of a Fœtus, enveloped in its Membranes wiith Placenta, and showing the Circulation . . . . 3*l.* 3*s.*
1518. Collection of Nine Fœtal Skeletons, with natural Ligaments, from the earliest stages to the full time, under glass shades . . 9*l.*
1519. Single Fœtal Skeleton, with glass shade . . . . . 1*l.* 1*s.*
1520. Collection of Nine Fœtal Skeletons, disarticulated, and each mounted on a black board, in a glazed case . . . . . . 18*l.*

ACCOUCHEMENT.

1521. Preparation of Characteristic Normal Female Pelvis with Ligaments, from 1*l.* 15*s.*
1522. Collection of Twenty Models from Nature of the best examples of the principal Distortions of the Pelvis, including two of normal conformation . . . . 30*l.*
1543. A single model from this collection . . . . . 1*l.* 11*s.* 6*d.*
1544. Fœtal Skull . . . . 6*s.* 6*d.*
1545. Mannekin, consisting of Female Pelvis covered with leather, with elastic Vagina, leather Fœtus with Skull, Placenta, &c. for demonstrating Obstetric Manipulations, in a box . . . . 5*l.*
1546. Set of Seven Models, illustrating the Accidents of Labour . 7*l.* 7*s.*

MICROSCOPY.

2001. Pocket Lens of three powers, in tortoiseshell cases . 15*s.* & 1*l.* 1*s.*
2002. Herschel's Periscopic Lens especially adapted for the examination of Minerals . . . . 10*s.* 6*d.*
2003. Telescopic Stand for the above Lenses . . . . . 10*s.* 6*d.*
2004. Universal Movement Stage, for facilitating the examination of Mineral Bodies, &c. . . . .
2005. Large Lens, for dissections under water, &c., with set of cells and loaded corks, in box with fittings for numbers . . . .
2006. PROF. QUEKETT'S POCKET DISSECTING MICROSCOPE, with 1-inch, ½-inch, and ¼-inch lenses, mirror, &c. Size, 5½ inches square by 1½ deep, when packed, price . . . . . . 1*l.* 11*s.* 6*d.*
2007. Compound Body for the above, in box, to render it a TRAVELLING MICROSCOPE . . . . 2*l.* 2*s.*
2010. Nachet's Chemical, Physical, and Geological Microscope, with three powers, goniometer and polarizing apparatus, as described in 'Quekett on the Microscope,' p. 490, modified by S. Highley, jun., for the purpose of measuring the angle of optic axes and diameter of rings in uni-axial and bi-axial crystals (complete) . . 20*l.*

2011. HIGHLEY'S HOSPITAL MICROSCOPE, on Tripod Stand, inclinable body, large double sliding stage with diaphragm, plain and concave mirror, fine and sliding coarse adjustments to body, Huyghenian eye-piece, with adapting-piece for Ross's, Smith and Beck's, or Powell and Lealand's object-glasses . . . . 4*l.* 4*s.*

*** *(This instrument combines economy with simplicity, elegance of form, and excellence of workmanship.)*

2012. HIGHLEY'S HOSPITAL MICROSCOPE, with RACKWORK coarse adjustment . . . . 5*l.*

2013. HIGHLEY'S HOSPITAL MICROSCOPE, as above, with RACKWORK MOVEABLE STAGE, &c. . . . . 7*l.* 7*s.*

2014. Upright Mahogany Cabinet, with fittings for Highley's Hospital Microscope . . . . for 2011, 16*s.*:—for 2012 and 13, 1*l.* 5*s.*

ACHROMATIC OBJECT-GLASSES for Highley's Hospital Microscope and Queckett's Travelling Microscope, in brass boxes.

	Object Glasses	Magnifying Power, in Diameters.	Magnifying Power with Extra Eye-Piece	Price. £. s. d.
2016 . .	1-inch	100		1 1 0
2017 . .	$\frac{2}{3}$-inch	170		1 5 0
2018 . .	$\frac{1}{4}$-inch	350		1 11 6

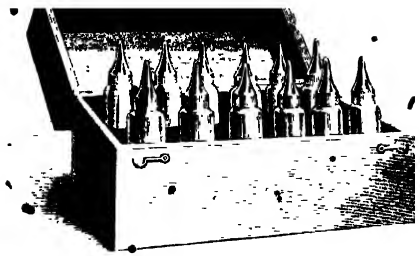
2032. Extra Eye piece . . . . 12*s.* 6*d.*
2033. Bull's-eye Condenser, with universal-jointed stem . . . 12*s.* 6*d.*
2034. Achromatic Condenser, with stage fitting . . . . . 1*l.* 1*s.*
2035. Polarizing Apparatus, with Selenite stage fitting . . 1*l.* 11*s.* 6*d.*
2036. Darker's Selenite stage . . . . 2*l.* 2*s.*
2037. Camera Lucida . . . . 1*l.* 5*s.*
2038. Microscope Pentagraph . . . .
2039. Micrometer eye-piece . . . . 1*l.* 5*s.*
2040. Stage Micrometer $\frac{1}{1000}$ . . . . 6*s.*
2041. Animalcule Cage . . . . 8*s.* 6*d.*
2042. Compressorium . . . . 15*s.*
2043. Frog Plate . . . . 6*s.*
2044. Brass Forceps . . . . 2*s.* 6*d.*
2345. Stage Forceps . . . .

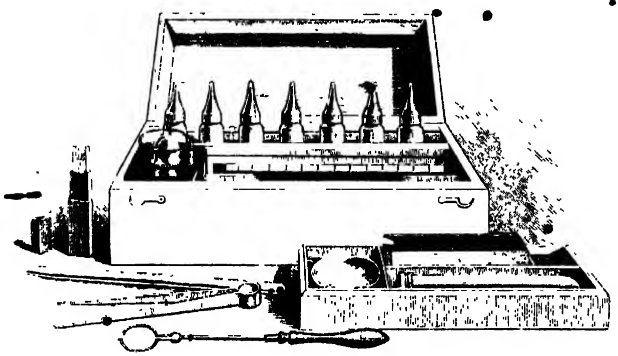
2046. HIGHLEY'S ACHROMATIC GAS MICROSCOPE LAMP, with reading shade and mounting apparatus. Constructed to correct the yellow, glaring, and injurious light of the ordinary gas lamp, as described in the 'Quarterly Journal of Microscopical Science.' Part II. p. 142; and 'Quekett on the Microscope,' p. 489. In bronze . 2*l.* 12*s.* 6*d.*

2048. HIGHLEY'S CABINET OF MICROSCOPICAL CEMENTS, containing Canada balsam, gold-size, shell-lac varnish, Brunswick black, gum arabic, in capped bottles; marine glue, hinged mounting plate, and spirit lamp.

2049. HIGHLEY'S CABINET OF MICROSCOPICAL MOUNTING APPARATUS, containing improved Valentine's knife, 3 scalpels, 2 needle-holders and various needles, 3 pair of scissors, curved forceps, 2 injecting forceps, cork forceps, cutting diamond, writing diamond, 3 brass cutting rings, small chisel, pipette, section cutter, section knife, bone saw, polishing bone, syringe and 3 jets, whirling table, thick and thin glass cells, &c.

2050. Injecting Water-bath and Cans . . . .
2051. HIGHLEY'S SECTION CUTTER, with knife and saw in a box .





STUDENTS' COLLECTIONS OF MICROSCOPICAL OBJECTS.

2061. FIRST SERIES:—1. Butterfly's Dust. 2. Piece of a Butterfly's Wing. 3. Scale of a Sole. 4. Hairs of Ornithorhynchus (N. Holland). 5. Transverse section of the Bristly Hair of a Porcupine. 6. Bird's Feathers. 7. Tip of Spider's Foot. 8. Upper Jaw of Spider. 9. Head of Spider. 10. Inferior Wing of a small Beetle. 11. Proboscis of the Bee. 12. Skin of Ephemera. 13. Transverse section of Lilac-twig. 14. Injected piece of Rabbit's small Intestine. 15, 16, 17, 18. Parts of Scaly Curculios. 19. Cornea of a Compound Eye. 20. Part of a Metal shining Beetle. 21, 22. Humming-bird's Feather. 23. Crystals of Sulphuret of Iron in Dolomite. 24. Crystals of Silver. 1*l*. 5*s*.

2062. SECOND SERIES:—1. Chalk from Meudon. 2. Chalky Marl or Clay from Caltanisetta. 3. Calcareous Earth of Cara, St. Giorgio. 4. *Bergmehl* from Lillhaggsion in Lapland. 5. *Bergmehl* from Eger. 6. Sertularia Cupressina. 7. Calcareous Spiculæ of Pennatula rubra. 8. Silicious Spiculæ of Sponge. 9. Calcareous Spinioles of Gorgonia Muricata. 10. Section of Skin of Holothuria. 12. Calcareous Framework of Skin of Holothuria. 12. Calcareous Body from the Oral Tentacula of Holothuria. 13. Calcareous Body of an Euryale. 14. Calcareous Body of a Star-fish. 15. Suctorial Pedicles of Sea-urchin. 16. Spine of Sea urchin. 17. Pedicellaria of Sea-urchin. 18. Ptilota Plumosa. 19. Transverse section of Fern. 20. Longitudinal section of Fern. 21. Scalariform vessels of Fern. 22. Spiral vessels of Fern. 23. Transverse section of Vine. 24. Transverse section of Fir. 1*l*. 5*s*.

2063. THIRD SERIES:—1. Calcareous Body of Synapta. 2. Skin of Synapta. 3. Spongia. 4. Silicious Structures of Sponge. 5. Echinorhynchus (Intest. worm). 6. Serpula. 7. Hook of a Serpula. 8. Rudimentary Foot of a Nereis. 9. Crisia Eburnea. 10. Flustra. 11. Flustra upon Algæ (Transverse section). 12. Cirrhipedia (feet). 13. Cirrhipedia (Cibarial apparatus). 14. Ghost-crab (Caprella). 15. Scales of Eleagnus. 16. Silicious Hairs of Deutzia. 17. Silicious Skeletons of Equisetum. 18. Crystals from Plant-cells. 19. Transverse section of a Truffle. 20. Lichens—Spores. 21. Dasya. 22. Plocamium. 23. Callithamnion. 24. Ceramium. 25. Polysiphonia . 1*l*. 5*s*.

2064. FOURTH SERIES:—1. Tip of the tail of the Palæmon. 2. Stomach of River Crab. 3. Palate of a Beetle. 4. Jaw of ditto. 5. Mouth of Hæmatopota Pluvialis. 6. Mouth of Tabanus Tropicus. 7. Lower jaw of ditto. 8. Tip of the foot of the same. 9. Embryos of River Muscle. 10. Mouth of Helix Pomatia. 11. Tongue of Patella. 12. Tongue of Littorina. 13. Skin and scales of Perca Fluviatilis. 14. Sanguiferous globules of spotted Salamander. 15. Hair of Alpine Hare. 16. Transverse section of Dicotyles. 17. Phragmidium Incrassatum. 18. Hypnum Tamariscinum 19. Peristom of Dicranum Scoparium. 20. Tips of branch of Sphagnum Cymbifolium. 21. Fructiferous branch of Radula Complanata. 22. Spurs of ditto 23. Sporongiæ of Asplenium Filix Femina. 24. Transverse section of basis of Equisetum Thelmateja. 25. Spurs and point of Sporangium of Equisetum Arvense . . . . . 1*l*. 5*s*.

2065. FIFTH SERIES . . . . 1*l*. 5*s*.

MICRO-CRYSTALLOGRAPHY.

*** *See Goniometry, Collections Nos.* 28, 29.

MICRO-CHEMISTRY.

2091. HIGHLEY'S CABINET OF APPARATUS AND REAGENTS, for Examinations in Medical Chemistry, as selected by Dr. LIONEL BEALE.

CONTENTS.—*Apparatus.*—Urinometer in Case—Graduated 2 oz. Measure—Pipette—Stirring-rod—Microscopic Slides and Thin Glass—Watch-glasses—Test-tubes—Tube-holder—Brass Forceps—Platinum Foil—Spirit Lamp with wire ring—Seven capped Dropping Bottles for the following Reagents:—Nitric Acid, Acetic Acid, Ammonia, Potash, Nitrate Barytes, Nitrate Silver, Oxalate Ammonia, Test-Papers, . . . 1*l.* 11*s.* 6*d.*

2092. HIGHLEY'S REAGENT CABINET for Microscopical Testing, containing 12 capped Dropping Bottles . . . . 15*s.*

MICRO-PHOTOGRAPHY.

2095. HIGHLEY'S ARRANGEMENT for Object-glass, Stage, and Mirror for Microscopical Photographs, as described in the 'Quarterly Journal of Microscopical Science,' No. IV., and adaptable to any Camera; with adapting-piece for Ross's, Smith and Beck's, or Powell and Lealand's object-glasses . . . . 3*l.* 3*s.*

2096. Double Combination Condenser for the above Arrangement . 1*l.* 1*s.*

2097. HIGHLEY'S MICROSCOPE CAMERA, consisting of the above Arrangement and Condenser fitted to a double telescope chamber having a range from 12 to 24 inches, with focussing-glass 6 inches square, plate and bath frames, glass bath, box fitting inside camera, containing all the necessary chemicals and apparatus. The whole contained in a packing-case arranged for the adjustment of this instrument to any angle. Complete . . . . 9*l.*

2098. The Camera, Chemicals, Cases, &c., without Highley's Arrangement, but with adapting-piece for any maker's microscope . . 5*l.* 5*s.*

PHOTOGRAPHY.

This List will shortly be added.

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